

A. *Euchromiidae*, *Nolidae*, *Arctiidae*, *Pericopidae*

The material of this report should give a fair sample of the fauna of Barro Colorado Island, and is presented to put the new data on record, but also to serve as a basis for other studies, biological and the like, which may be made there. It is based on collections made all through the year except for a short gap in the latter part of August and September, but more systematically in November to February, 1934-35, when Dr. Marston Bates was collecting continuously and intensively, and in February and March of 1936, when a group of the staff of the American Museum of Natural History worked there. While many more species will certainly be taken, especially those whose main flight periods come in the summer, it is probable that all the really dominant species are included, and that except for mid-summer, few of the more conspicuous forms are omitted.

The great mass of the material is in the Museum of Comparative Zoölogy. The American Museum has the lot collected in Feb.-Mar., 1936, by F. E. Lutz, W. J. Gertsch and Wm. C. Wood, and a few collected by C. H. Curran in 1935, and Cornell a few collected by J. C. Bradley in Mar.-Apr. 1924. The principal collectors for the Museum of Comparative Zoölogy were Dr. Bates, Mr. A. Friedman in the early summer of 1935, Graham Fairchild in the summer of 1923, and Nathan Banks in the summer of 1924; the last two contributing relatively few specimens but giving us our only knowledge of the summer fauna.

Another lot that has been mentioned and included in the keys is that taken by Mr. August Busck in the part of the Canal Zone which has since been flooded, in 1911-12. So far as this fauna survives it must have taken refuge on Barro Colorado Island, and a few more limited areas. The records were published by Dyar<sup>1</sup>, and a few more have been added which were identified or described more recently from the same lot, in most cases by Dr. William Schaus.

For the sake of compactness, collectors' names will be cited specifically only in records of unusual character, and all records not otherwise credited are to be assumed as referring to Barro Colorado material, now in the Museum of Comparative Zoölogy. Duplicates

<sup>1</sup> Proc. U. S. Nat. Mus. xlvii, 1-67 (Busck), 139-350 (Dyar); 1914.

of most of the species will be deposited in the Cornell University Collection.

The four families discussed here form a homogeneous group, closely related to the Noctuidæ, with which they share the "quadrid" venation and the thoracic tympanum. Larval characters would indicate that the Nolidæ are directly derived from the Noctuidæ (Sarrothripinæ), but that the others are of a parallel stock arising from the Hypsidæ.

The get-up of the paper is designed to be convenient for those intending to identify material as a basis for biological studies; so brief keys are included of the species actually taken on the Island, and those included in the National Museum survey; and the bibliographic citations emphasize the published figures.

The following are the principal works on the area:

- DRUCE, H.: *Biologia Centrali-Americana, Lepidoptera-Heterocera*. 2 vols. text and one of plates (abbreviated in the citations of figures as "Biol." with plate and figure numbers).
- HAMPSON, G. F.: *Catalogue of the Lepidoptera Phalænæ*, i and Supplement i (Euchromiidae as Syntomidae or Amatiidae), ii and suppl. i (Nolidæ; Lithosiinæ), iii and suppl. ii (Arctiinæ); (abbreviated "Hamps." and "Hamps. Suppl." with plate and figure).
- SEITZ, A.: *Macrolepidoptera of the World or Grossschmetterlinge der Erde*; vi, Euchromiidae, Nolidæ and Lithosiinæ by M. Draudt, Arctiinæ by Seitz, Pericopidae by M. Hering; (abbreviated "Seitz" with plate, line, and figure counting from the left).
- ROTHSCHILD, WALTER: *Novitates Zoologicæ* xvii, 1-85, 113-171, 1910 (giving fuller distributions of many species).
- DYAR, H. G.: *Proc. U. S. National Museum* xlvii, 139, 1914, (giving further Canal Zone data for many species).<sup>1</sup>

In the case of the first three works the numerous figures are cited very briefly;—other figures referred to are cited sufficiently fully to lead directly to their location. In general the figures in Seitz are copies of the others, and frequently have lost something in copying. It also figures a few species described since Hampson's supplements.

Where descriptions of early stages have been noted they are cited in the bibliographies, and summarized in the text, but otherwise the

<sup>1</sup> Rothschild has also published a series of papers on these families supplementary to Hampson's Catalogues. The principal ones are *Nov. Zööl.* xvi, 21-55, 268-299, pls. 4-7; xvii, 172-188, 429-445, 504-506, pls. 11-14; xviii, 24-45, 154-158, pls. 3-6; xix, 151-186, 212-246, pls. 3-5; xx, 192-226, pls. 13, 14.



bibliography is cut to the original description, reference to important or convenient figures, and new or obscure synonymy. A somewhat more complete bibliography will be found in the *Lepidopterorum Catalogus*, fascicles vii (*Syntomidae*, i.e. *Euchromiidae*, by Zerny, 1912), xxii (*Arctiinae* by Strand, 1919), xxiv (*Nolidae* by Strand, 1920), xxvi (*Lithosiinae* by Strand, 1922) and xlv (*Pericopidae* by Bryk, 1931).

Dates for the commoner species are presented in tabular form at the heads of the families *Euchromiidae* and *Arctiidae*,—those of rarer forms are included in the text.

## EUCHROMIIDÆ

(*Syntomidae*; *Amatidae*; *Zygænidæ* of earlier authors)

Head with strong palpi and tongue and conspicuous ocelli; thorax with tympanum below base of hind wing (vestigial in the Old World types), protected by a hood developed from the first segment of the abdomen above the spiracle; fore wing with apparently 4-branched Cu (except a few species which have lost  $M_2$ ); hind wing relatively small, Sc normally absent, in some primitive species visible as a short spur from upper side of cell beyond middle. Larva with a single large subdorsal wart each on meso- and metathorax; with feathery tufted hair and usually pencils, which are most often lateral on first and 8th segments of abdomen. Pupa fusiform, without cremaster or flange-plates on sides of abdomen, with antennæ and tongue extending to tips of wings; glossy.

The absence of Sc will separate this family as a rule from the *Arctiidae*, but in *Eucereon*, *Episcepsis*, *Aclytia* and *Hyaleucerea* there are species with Sc preserved, while many *Phegopterine* *Arctiidae* have Sc more or less aborted, and a few have lost it entirely. The *Euchromiidae*, unlike the *Arctiidae*, are almost always heavily pigmented forms with brown or black veins, while most of the *Arctiidae* are lightly pigmented night-flyers. The *Belemnina* group would be an exception but should probably be transferred to the *Euchromiidae*.

I should divide the family into three subfamilies. The *Amatinae* are limited to the Old World, and all save a few primitive African types (*Pseudapiconoma*, *Melisa* and *Phæosphecia*) have fused R and  $M_1$ , so that the hind wing has only a single vein from the upper angle of the cell. In the *Euchromiinae*  $M_2$  of the hind wing is rudimentary or absent, being represented by a faint vein or line of scales from the angle of the discocellular, and  $Cu_1$  and  $Cu_2$  are stalked or united; while in the *Ctenu-*

*china*  $M_2$  is fully developed and curved, arising from below the angle of the discocellulars, and  $Cu_1$  and  $Cu_2$  are widely separated except in the Horama group. A few aberrant genera also have  $M_2$  obsolescent from the angle but  $Cu_2$  well separated. I believe these are aberrant Ctenuchinae, but none have yet been taken on Barro Colorado Id. The two latter subfamilies are New-world, except the single genus *Euchromia*; and the Nearctic species are all Ctenuchinae, one or two *Euchromiinae* reaching north to Georgia.

The diagram opposite records the dates of capture of the commoner species, as represented in the collections of the Museum of Comparative Zoölogy. Each column represent a quarter of a month. Where a single specimen was taken it is indicated by an open circle (o), if more than one by a solid spot (●). In the case of Fairchild's specimens, which were not individually dated, records are indicated by a line covering the proper period, and the number of specimens. Except for such of these as may have been taken in early August, August and September are vacant. Dyar (l.c.) gives further regional dates.

### Key to Genera of *Euchromiidae*

1. Hind wing with  $Cu_1$  and  $Cu_2$  stalked or united, in the latter case the hind wing with only three dorsal veins, and the two lower (which are  $M_3$  and  $Cu_{1+2}$ ) arising closer together than to  $M_2$ , or with only two dorsal veins,  $M_2$  being a rudimentary fold or line of scales extending from the angle of the discocellular (*Euchromiinae* and *Horama* group)<sup>1</sup>. . . . . 2
- Hind wing with  $Cu_2$  widely separated;  $M_2$  and  $M_3$  sometimes united, in which case the two most dorsal veins ( $Cu_1$  and  $Cu_2$ ) are well separated and the upper ( $M_{2+3}$  and  $Cu_1$ ) are close together or stalked, never with only two dorsal veins (*Ctenuchinae*). . . . . 22
2. Upper of the three veins ( $M_2$ ) separated by a distinct space from the stem of the other two at origin. . . . . 3
- Upper of the three veins (normally  $M_3$ ) connate or short-stalked with the stem of the other two at origin. . . . . 4
3. Head and prothorax densely hairy. . . . . *Amycles*
- Head and prothorax smoothly scaled. . . . . *Ceramidia*

<sup>1</sup> In the *Euchromiinae* there are only 3 veins by the obsolescence of  $M_2$ ; in the members of the Horama group which have been reported from the Zone there are only 3 veins by the complete union of  $Cu_1$  and  $Cu_2$ , in Horama itself, which is regional,  $Cu_1$  and  $Cu_2$  are forked toward the margin.

## SEASONAL RECORD OF BARRO COLORADO ISLAND EUCHROMIIDAE

[illegible]

4. Fore wing with  $R_1$  and  $2$  stalked (normally arising out of the base of  $R_{3-5}$ ) .....5  
Fore wing with  $R_2$  stalked with  $R_{3-5}$ ,  $R_1$  separate .....6  
 $R_2$  arising separately from cell .....21
5. Wings with transparent spots or areas ..... *Leucopleura*  
Wings opaque and evenly scaled ..... *Psoloptera*
6. Abdomen with small divergent sublateral tufts on last segment; the Barro Colorado species markedly constricted at third segment ..... *Phanicroprocta*  
Abdomen without lateral tufts on last segment, the abdomen constricted at second segment if at all .....7
7. Second segment of abdomen narrowed by a slight notch in front, abruptly widened behind, wasp-like ..... *Pompiliodes*  
Second segment of abdomen not constricted .....8
8. Antenna with middle part of shaft considerably widened as compared with its base, especially in female .....9  
Antenna with shaft not widened, or in female with middle of shaft a little wider than extreme base .....13
9. Disc of thorax with considerable long hair ..... *Homocera*  
Thorax with long hair only on edges of tegulae etc., mostly close-scaled .....10
10. Hind tibiae toward end and tarsi fringed with long scales, at least above; blade-like ..... *Macrocneme*  
Hind tibiae with the usual close scaling .....11
11. Hind wing with lower part of cell very short, reaching only about  $1/3$  way to apex of wing; wings transparent ..... *Isanthreme*  
Hind wing with lower side of cell longer, reaching almost half length of wing .....12
12.  $Cu_1$  of fore wing arising almost half way between  $M_3$  and  $Cu_2$  ..... *Dycladia*  
 $Cu_1$  of fore wing arising about  $1/4$  as far from  $M_3$  as from  $Cu_2$  ..... *Autochloris (Bombyliodes)*
13. Fore wing with  $M_2$  leaving cell well above origin of  $M_3$  .....14  
 $M_2$  and  $3$  closely approximate or connate at origin .....15
14. Hind wing with lower discocellular very short, obsolescent ..... *Loxophlebia*  
Hind wing with lower discocellular a fifth as long as middle one ..... *Mesothen*
15. Hind wing with lower discocellular obsolescent, about  $1/10$  as long as middle; lower side of cell less than  $1/4$  length of wing... *Pheia*

- Hind wing with lower discocellular about  $1/6$  as long as middle or longer; cell more than  $1/4$  length of wing. . . . . 16
16. Fore wing with  $R_1$  stalked on  $R_{2-5}$ ; cell of hind wing moderate with lower discocellular moderately long, and  $M_3$  and  $Cu_1$  moderately stalked. . . . . *Chrostosoma*  
Fore wing with  $R_1$  arising separately from cell. . . . . 17
17. Hind wing with  $M_3$  and  $Cu_1$  strongly stalked,  $1/3$  or more of the distance from end of cell to margin. . . . . 18  
Hind wing with  $M_3$  and  $Cu_1$  connate or barely stalked. . . *Saurita*
18. Thorax densely hairy, except patches on the collar and sometimes shoulders, which are smoothly scaled. . . . . *Sarosa*  
Thorax with at least large areas on tegulae and disc closely scaled as well as collar, frequently with only fringes of long hair on tegulae etc. . . . . 19
19. Wings solidly scaled, at most with small transparent streaks on basal part of fore wing and base and disc of hind wing. *Rhynchopyga*  
Wings largely transparent, usually less elongate. . . . . 20
20. Outer margin of hind wing evenly rounded or nearly so (sometimes somewhat lobed in small species with dominantly yellow bodies).  
*Cosmosoma*  
Outer margin of hind wing with anal lobe separated by a distinct notch; abdomen dominantly dark with blue spots; thorax normally more hairy. . . . . *Gymnelia*
21. Fore wing with  $M_2$  and  $M_3$  closely parallel about  $1/4$  way to margin, then divergent; hind tibia but slightly flattened and not fringed  
*Calonotos*  
Fore wing with  $M_2$  and  $M_3$  immediately divergent; hind tibiae and tarsi with strong fringes of hair-scales above. . *Macrocneme* (part)
22. Both wings with a dorsal vein absent ( $M_2$  and  $M_3$  united); small wasp-like species with transparent wings. . . . . *Syntrichura*  
Fore wings with all dorsal veins present. . . . . 23
23. Hind wing with a dorsal vein absent. . . . . 24  
Both wings with all veins present. . . . . 27
24. Wings opaque or with small translucent spots; abdomen simple; hind wing with cell normal and the interspace between  $M_{2+3}$  and  $Cu_1$  twice as long as wide. . . . . *Delphyre*  
Wings broadly translucent or transparent; abdomen with lateral tufts on terminal segment. . . . . 25
25. Wings perfectly hyaline (with black markings); cell of hind wing normal, abdomen with a pair of lateral tufts on last segment  
*Metastatia*

- Cell of hind wing very long, the interspace between veins  $M_{2+3}$  and  $Cu_1$  about as wide as long. . . . . 26
26. Wings hyaline; abdomen constricted on third segment but continuing narrow, and not specially marked there; abdomen with only anal tufts. . . . . *Chrysostola*  
 Wings translucent; abdomen strongly constricted at third segment and with white spots, making it seem even more slender; with lateral as well as anal tufts. . . . . *Eumenogaster*
27. Abdomen more or less constricted at second segment. . . . . 28  
 Abdomen not constricted, or slightly constricted at third segment (*Marccidia*) . . . . . 30
28. Abdomen strongly constricted, wasp-like; the anal area of hind wing reduced to a hairy lobe. . . . . 29  
 Abdomen moderately constricted; anal lobe normal. . . . . *Æthria*
29. Shaft of antenna thickened and roughly scaled above near middle; male abdomen frequently with a long terminal filament  
*Trichura*  
 Shaft of antenna smooth and slender. . . . . *Argyrooides*
30. Antenna with middle part of shaft fringed with long hair; wings hyaline. . . . . *Dinia*  
 Antenna with shaft smoothly scaled; wings normally fully scaled 31
31. Palpi upturned, with third joint also erect, continuing the general line of the palpus. . . . . 32  
 Palpi upturned or oblique, but with the third joint porrect, frequently long. . . . . 43
32. Hind wing with  $M_2$  arising from close to angle of cell or stalked with  $M_3$ . . . . . 33  
 Hind wing with  $M_2$  well separated from  $M_3$ . . . . . 38
33. Fore wing with  $Cu_1$  concave above, separate from  $M_3$  at origin and strongly convergent to  $Cu_2$  at margin; hind wing with  $M_3$  and  $Cu_1$  stalked. . . . . *Mydromera*  
 Fore wing with  $Cu_1$  and  $Cu_2$  normally divergent to margin . . 34
34. Both wings with  $M_2$  and  $M_3$  distinctly stalked; wings translucent  
*Atyphopsis*  
 Fore wing with  $M_2$  and  $M_3$  separate, hind wing with them separate or shortly stalked; wings normally opaque. . . . . 35
35. Fore wing with  $R_2$  stalked on  $R_{3-5}$ . . . . . 36  
 Fore wing with  $R_2$  free. . . . . *Hyaleucerea*
36. Basal segments of abdomen dorsally or subdorsally clothed with rough hair. . . . . *Eucercon*  
 Abdomen smoothly scaled to base. . . . . 37



37. Hind wing of normal size; tympanic hoods conspicuous above  
*Napata*  
 Hind wing relatively small, more or less aborted in male; tympanic hoods inconspicuous. . . . . *Androcharta*
38. Hind wing with  $M_3$  and  $Cu_1$  stalked. . . . . 39  
 Hind wing with  $M_3$  and  $Cu_1$  arising separately from cell. . . . . 40
39. Fore wing with  $R_2$  separate;  $M_1$  connate with  $R_{3-5}$ . . . . . *Aclytia*  
 Fore wing with  $R_2$  stalked on  $R_{3-5}$ ;  $M_1$  arising distinctly separated  
*Heliura*
40. Abdomen dorsally or subdorsally clothed with rough hair toward base. . . . . 41  
 Abdomen smoothly scaled to base. . . . . *Hypocladia*
41. Fore wing with  $M_2$  and  $M_3$  approximated for some distance from origin. . . . . *Ptergopterus*  
 Fore wing with  $M_2$  and  $M_3$  divergent from origin. . . . . 42
42. Hind wing with  $M_3$  and  $Cu_1$  widely separated, with the transparent area sharply bounded; typically with R and  $M_1$  stalked, and with  $R_2$  free in fore wing, but the present species with R and  $M_1$  of hind wing and  $R_2$  of fore wing stalked. . . . . *Ecdemus*  
 Hind wing with  $M_3$  and  $Cu_1$  connate, the transparent area vague and partly scaled over;  $R_2$  always stalked; R and  $M_1$  of hind wing connate or barely stalked. . . . . *Episcepsis*
43. Shaft of antenna widened beyond middle; hind wing small, less than half as long as fore wing, the anal area reduced with a single anal vein; hind tibia of male much enlarged, with sex-scaling  
*Marecidia*  
 Antenna shaft normal; hind wing relatively larger, frequently large with ample anal area; hind tibia normal. . . . . 44
44. Middle and hind tibiae smooth. . . . . *Ctenueha*  
 Middle and hind tibiae tufted at the spurs. . . . . 45
45. Palpus with third segment set at an angle to second, which is oblique, and half as long; tip of second segment tufted; fore wing with  $M_2$  and  $M_3$  long-stalked, the wing very narrow  
*Correbia*  
 Palpus with third segment continuing the line of the second or with a gentle down-curve; wings moderately broad,  $M_2$  and  $M_3$  separate or only short-stalked,  $M_3$  and  $Cu_1$  often stalked  
*Correbidia*

## Subfamily EUCHROMIINAE

## POMPILODES Hampson

A curious feature of this family is the close parallelism of pattern in members of the two subfamilies. Thus the perfect type of wasp-mimicry is duplicated in *Pseudosphex* and *Argyroeides*, though the narrowing at the "waist" takes place in a different way; the present genus (which is a mimic of *Parachartergus*) is duplicated by *Amycles*; *Macrocneme* by *Horama*; the aberrant *Chrostosomas* by *Metastatia* and *Cacostatia*, *Dycladia* by *Correbia* and *Correbidia* and so on. In this genus the wasp-waist is evanescent, but the general appearance is perfectly wasp-like.

322<sup>1</sup> POMPILODES ALIENA Walker

*Euchromia* (*Pampa*) *aliena* Wlk. List Lep. Ins. B.M. i, 241, 1854.

*Figured:* Hamps. fig. 76<sup>2</sup>; Herrich-Schäffer, Aussereur. Schm. 73 (as *Glaucopis flavofascia*) 80 (as *Amycles* (?) f.), fig. 231; Seitz 10: k3.

Blackish, with a pale patch near apex of fore wing, large in male, more or less obsolete in female. *P. postica* Wlk. is merely the more southern race, with normally smaller pale patch. *P. tenebrosa* Wlk. differs in the mainly transparent hind wing.

Chief flight at end of Jan. (see diagram). Guatemala to Amazons.

## HOMŒOCERA Felder

This genus begins the *Cosmosoma* complex, which extends to *Saurita*, probably the ancestor of the group. The genera are close and partly artificial, and the hairy vestiture is probably secondary, *Sarosa*, e.g. having two groups, one derived from *Cosmosoma*, the other from near *Gymnelia*. *Homœocera* has a lobed anal angle like *Gymnelia*, from which it also derives. The venational characters vary some and the key may not allow enough for individual variation, though it has been checked.

## 333 HOMŒOCERA STICTOSOMA Druce

*H. stictosoma* Dr. Ann. Mag. Nat. Hist. (7) i, 402, 1898.

*Figured:* Hamps, 6: 17; Seitz 11: 4.

Easily recognized by the abdominal spots; subdorsal on 1, lateral on 2, both dorsal and lateral on 3.

<sup>1</sup> The numbers attached to the species refer to the appropriate volumes of Hampson's Catalogue of the Lepidoptera Phalaenæ; the simple numbers are those cited as species in vols. i-iii, those with a decimal to forms cited there as subspecies, and those with a letter to the corresponding volumes of the Supplement (i, ii).

<sup>2</sup> Figures so cited are in black and white, showing pattern and venation.

Dominant at end of Jan. (see diagram. p. 101). Described from "Colombia" (at a date when Panama was part of Colombia).

Dyar reports *Isanthrene crabroniformis* Staud. (Biol. 6: 23; Seitz 9. 14), from the Canal Zone. It is yellow-hyaline, with black, yellow and blue abdomen.

### AUTOCHLORIS Hübner (*Bombyliodes* Hampson)

Differs from *Gymnelia* only in the more broadened antennæ. I follow Hampson in changing this name (Suppl. p. 102). It is a question of the identity of *Autochloris almon* (Cr.). The larva of *A. almon* as figured by Stoll (11: 1) is mouse gray, with 4 long anterior and two posterior black pencils, tipped with white.

### 363 AUTOCHLORIS JANSONIS Butler

*Gymnelia jansonis* Btl. Cist. Ent. i, 116, 1872.

Figured: Butler, Lep. Exot. 61: 17; Seitz 11: b2.

Abdomen with a cream white bar across first segment, and orange streaks on middle segments. Three females.

May 25 (Friedman), July 12, 1924 (Banks); Nov. 9-10, (Am. Mus. Nat. Hist.). Costa Rica and Panama.

### SAROSA Walker

This is a heterogeneous genus, *S. innotata* being a hairy variant of *Cosmosoma* (with the typical forms even more hairy) while *lutibasis* is merely a somewhat more hairy *Autochloris*. The female is less hairy than the male, female *lutibasis* being only about as hairy as males of *Autochloris*.

1. Disc of thorax and most of body yellow. . . . . *innotata*  
 Body black with a double yellow patch at junction of thorax and  
 abdomen. . . . . *lutibasis*

### (380.1) SAROSA INNOTATA Draudt

*Sarosa notata*, ab. 1 Hamps. Cat. Lep. Phal. i, 187, 1898.

*Sarosa notata*, form *innotata* Ddt. in Seitz Macrolep. World vi, 53, 11: f5, 1915.

? *Pacilosoma semirubra* Ddt. in Seitz Macrolep. World vi, 202, 28: d9, 1917  
 (as determined in U. S. Nat. Mus.).

Wing form as in *Cosmosoma*; black head, shoulders, and tail with blue spots. The present specimens have less black than normal on the discal bar, and are undersized. The amount of black on the tegulæ varies.

Dec. 26, Jan. 3, 9, 10. Described from Ecuador.

## 378d SAROSA LUTIBASIS Hampson

*S. lutibasis* Hmps. Ann. Mag. Nat. Hist. (7) viii, 171, 1901.

*S. mora* Dyar, Proc. U. S. Nat. Mus. xlvii, 161, 1914 (not Schaus).

*Figured:* Hamps. Suppl. 5: 20; Seitz 27: d7.

Body mostly black and blue, with a whitish lateral spot on third segment, but no orange or white stripes otherwise. No white spot at base of fore wing; wings deeply yellow.

Jan. 12–Apr. 3. Described from Panama. Ranges south to the Amazons (U. S. Nat. Mus.).

*S. mora* Schs. from Costa Rica, has a narrower border, more orange on costa, and a longer black streak in cell  $R_5$ .

## GYMNELIA Walker

Very close to the preceding genera, the antenna less swollen though perceptibly so in female. Third segment of palpus normally longer and almost porrect. This genus intergrades with *Cosmosoma* and many of the species were placed there in Hampson's 1898 revision. The lobed anal angle of the hind wing, now used by Hampson, intergrades perfectly, but the intermediate species so far known from the Canal Zone are small ones with yellow bodies (see *Cosmosoma*). There are now listed some 40 species, many of which will probably turn out to be merely color forms.

1. Abdomen striped with orange; much orange on body and wings; ventral valve of male half white. . . . . *beata*  
Abdomen black and blue except the orange tail; second segment of abdomen below usually merely edged with white. . . . . 2
2. Inner margin of fore wing with an orange patch, bisected by the black anal vein; first segment of abdomen dorsally practically wholly yellow. . . . . *perniciosa*  
Inner margin of fore wing mostly black; first segment of abdomen above with paired yellow spots or wholly black. . . . . 3
3. Larger; fore wing with black on discal bar practically limited to the angulate discal vein; front and extreme base of fore wing black with blue spots, only; end of abdomen orange; ventral valve of male white; inner margin of hind wing transparent. . . . . *salvini*

Similar, but with discal bar slightly widened, and with no orange at end of abdomen; ventral valve of male practically wholly

black; inner area of h.w. solid black; under side of costa yellow, half as wide as cell, and cell itself with more yellow.

*hyaloxantha*

Smaller species, the front and base of f.w. with white spots; abdomen normally with 3 terminal segments orange; discal bar thick and straight. . . . . *colona*

#### 496, 390c GYMNELIA BEATA Butler

*Homococera beata* Btl. Jour. Linn. Soc. Zool. xii, 376, 1876.

*Figured:* Hamps. 8: 15; Seitz 13: h1.

Border extremely narrow; more orange on thorax as well as abdomen; more white on abdomen below.

Near light house, Dec. 1 (Schwarz, Am. Mus. N. H.) May 16 (Frost, U. S. Nat. Mus.) also Balboa, etc., and Colombia (type).

#### 494, 391a GYMNELIA SALVINI Butler

*Homococera salvini* Btl. Jour. Linn. Soc. Zool. xii, 376, 1876.

*Figured:* Butler, Ill. Typ. Lep. Br. Mus. i. 7; 4; Seitz 14: m6 (as *Cosmosoma*).

Mid trochanters dark, contrasting with hind ones; no white on sides of thorax or base of wings; two anal segments orange, above and below; membrane of wings more orange than *colona*, less than *Sarosa lutibasis*. The abdominal segments have yellow basal lines, usually withdrawn within the preceding segments.

Common, all the year (see diagram, p. 101). Described from Panama.

#### 391d GYMNELIA HYALOXANTHA Dognin

*G. hyaloxantha* Dgn. Hét. Nouv. Am. Sud. vii, 4, 1914.

*Figured:* Hamps. Suppl. 6: 3; Seitz 27: d5.

Very near the preceding, and perhaps a variety of it, but with no orange on abdomen. The female type has the border of the wings broader than the present specimen which agrees with *salvini*. Valve black; costa of hind wing below orange.

July-Aug. (Fairchild), one male determined by Schaus as *salvini*. Described from Colombia on one female.

#### 391b GYMNELIA COLONA Schaus

*Cosmosoma colona* Schaus, Ann. Mag. Nat. Hist. (8) vii, 177, 1911.

*Gymnelia cennocha* Schs. Proc. U. S. Nat. Mus. lxxv (7) 4, 1924.

*Figured:* Hamps. Suppl. 6: 1; Seitz 27: c10.

A strikingly variable species. In typical *colona*, which is the dominant form, the anal orange covers part of the 6th segment above, and occasionally below, but there is no orange of the costa of the fore wing or yellow on first segment of abdomen. In *cennocha* Schs. the anal orange is reduced; specimens were also taken with yellow spots on first segment of abdomen or an orange costal stripe on fore wing, or with the sixth segment below mostly orange. Part of Dyar's *mathani* from the Canal Zone was based on yellow-spotted specimens of this.

Dominant in February and common (see diagram, p. 101). Described from Costa Rica.

The U. S. National Museum has a single specimen of *G. mathani* Roth. (Hamps. Suppl. 8: 6) from Paraiso, C. Z. The border is twice as broad, the first abdominal segment is paler yellow, except a median black dot, and the 7th segment is conspicuously black and blue on the sides.

#### GYMNELIA PERNICIOSA Dognin

*G. perniciosa* Dgn. Hét. Nouv. xxiii, 1, 1925.

Similar to *colona*, except as noted in key; the yellow on first segment of abdomen is deeper than in *G. mathani*.

Feb. 10, 1 ♀ (A.M.N.H.); Apr. 7 (Fried.), 1 ♂. Described from Colombia.

#### PHOENICOPROCTA Hampson (*Ilyela* Walker n.b.l.)

The small subterminal tufts on the abdomen are sometimes turned under and inconspicuous, especially in the female. The following species is aberrant in having the abdomen constricted at the third segment and bulbous beyond, and lacking the separate anal lobe. It has close relatives (or possibly color forms) now standing as *Cosmosoma* (*gemmata* Btl., *subflamma* Wlk.)

1. Male abdomen with crimson subdorsal stripes and under side, female black and blue. . . . . *insperata*  
Abdomen black, with orange middorsal spot on fourth segment. *paucipuncta*

#### PHOENICOPROCTA PAUCIPUNCTA Dyar

*P. paucipuncta* Dy. Proc. U. S. Nat. Mus. xlvii, 161, 1914.

? *Pheia gemmata* Btl. Jour. Linn. Soc. Zool. xii, 385, 1876.

Easily recognized by the orange middorsal spot, sometimes preceded and followed by smaller spots. This is probably merely a partial race



of *Cosmosoma gemmata* Btl. (Hamps. No. 504) from Venezuela. The body form and anal tufts may be unrecognizable in specimens that have been papered.

Nov.-Apr., common (see diagram, p. 101). Described from Canal Zone and only known from there, except for a single specimen in the U. S. National Museum from Venezuela, mixed with true *gemmata*.

*P. insperata* Wlk. (*rubiventer* Roth.) (Seitz 12: c1) is reported by Dyar from the Canal Zone.

### PHEIA Walker

Differs from *Cosmosoma* only by the extremely short dorsal side of the cell, with the lower limb of the discocellular almost lost (not quite as Hampson states). *P. elegans* is very close to *Cosmosoma saron*, even having the same arrangement of blue spots on the body. The typical species of *Pheia* have nearly simple antennæ.

1. Abdomen with small waist and tympanic hoods flattened against thorax as in *Pseudosphex* . . . . . *stratiotes*  
Abdomen not constricted, hoods inflated . . . . . 2
2. Abdomen mainly orange, male antennæ well pectinated . . . *elegans*  
Abdomen mainly black; male antennæ serrate . . . . . 3
3. Paired cream spots on first segment of abdomen . . . . . *utica*  
A single bar on first segment . . . . . *albisigna*

### 419 PHEIA ELEGANS Druce

*Cosmosoma elegans* Dr. Biol. Centr. Am. Het. i, 59, 7: 13, 1884.

Also figured: Seitz 12: d5.

Easily recognized by the abdomen, in which segments 2 and 6-8 are black, with subdorsal as well as dorsal blue spots, but 3-5 are mostly orange.

Jan. 23 (Bts.) Feb. 8 (Fried.); also taken by Bates at Lancetilla, Honduras. Mexico to Venezuela and Bolivia (U.S.N.M.).

### 425 PHEIA ALBISIGNA Walker

*Glaucopis (Pheia) albisigna* Wlk. List Lep. Ins. Br. Mus. i, 146, 1854.

*Pheia proterea* Schs. Proc. U. S. Nat. Mus. lxxv (7) 5, 1924.

Figured: Butler Ill. Lep. Het. Br. Mus. i, 7: 14; Seitz 12: f1.

A scarlet spot at base of fore wing and scarlet spots on collar and shoulders. Mid tibiæ much enlarged in male.

Mar. 25 (Fried.) Honduras to Amazons.

Dyar reports *P. utica* Druce and *P. stratiotes* Dyar.

### LOXOPHLEBIA Butler

The wide space between the origins of  $M_2$  and  $M_3$  in the fore wing separates this from most other Euchromiidae. Mesothen is very close, but the cell of hind wing is slightly longer.

Larva of *L. diaphana* with sparse tufts of hair, pencils on prothorax and segments 1 and 8 of abdomen; the pencils are slender on prothorax, short and dense on abdomen (Sepp, Ins. Surinam ii, 185, pl. 81; Hamps. i, 209). It feeds on Sapindaceæ.

1. Abdomen with black middorsal stripe above much broken or absent; under side also largely yellow. . . . . *flavipicta*  
 Abdomen with a continuous middorsal black stripe on thorax and abdomen; under side black, with white valve. . . . . *leucothema*.

### 427f LOXOPHLEBIA FLAVIPICTA Schaus

*L. flavipicta* Schs. Ann. Mag. Nat. Hist. (8) ix, 34, 1912.

Figured: Hamps. Suppl. 6: 28; Seitz 27: f6.

Male ventral valve enormous, extending to opposite end of 4th dorsal segment. Yellow, head and tail black; typically with a rounded mid-abdominal spot, usually without; the only female at hand with a broken longitudinal stripe on thorax and abdomen. Fore wing with an orange band crossing both transparent and opaque parts.

Oct., Dec., to Mar., May. Costa Rica.

### LOXOPHLEBIA LEUCOTHEMA Dyar

*L. leucothema* Dy. Proc. U. S. Nat. Mus. xlvii, 160, 1914.

Black. Collar orange; orange longitudinal subdorsal stripes from mesothorax almost to apex of abdomen. Wing-veins all black. Under side black, the valve large and broad and solid white. Female with white subventral stripes, connected across posterior edge of second (first chitinized) segment.

May 30 (Fried.) ♂; Lancetilla, Honduras, May 3 (Bates) ♀. Described from the Canal Zone and Venezuela.

### MESOTHEN Hampson

1. Thorax yellow. . . . . *pyrrha*  
 Thorax black, with white shoulder-spots. . . . . *ethcla*

## 445 MESOTHEN PYRRHA Schaus

*Dycladia pyrrha* Schs. Ent. Am. v, 89, 1889.

*Figured:* Biol. 71: 27; Seitz 12: i5; Hamps. fig. 101.

A recognition character is the double white bar on metascutellum and base of abdomen. Wings hyaline, with black veins and broad borders.

All season (see diagram, p. 101); also taken by Bates at Lancetilla, Honduras. Mexico to Guiana.

## 443c MESOTHEN ETHELA Schaus

*M. ethela* Schs. Ann. Mag. Nat. Hist. (8) vii, 175, 1911.

*Figured:* Hamps. Suppl. 7: 14; Seitz 12: i4.

Separable from *Cosmosoma melanotela* and *stibostictum* by the venation and white shoulder-spots.

Nov. 26-Apr. 5 (see diagram). Hamburg Farm, C. R. (Dodge). Described from Costa Rica.

Note that *Mesothen albifrons* of Seitz is *Cosmosoma galatea* Schaus, q.v.

## CHROSTOSOMA Hübner

A variant of the *Cosmosoma* type with  $R_1$  invariably stalked on the R-stem. All the local species have scarlet spots on shoulders and base of abdomen. Hampson's grouping by the presence or absence of  $Cu_1$  is incorrect, as all the species have preserved it. It is longer in the second group, which has not yet been found in the Canal Zone.

1. Discocellular spot of fore wing much thickened; under side of body black. . . . . *echemus*  
Discocellulars of fore wing black along the veins only; under side of body white in male. . . . . 2
2. Blue metallic scaling on base of front, back of head, a bar on scutellum, collar and subdorsally on abdomen. . . . . *n. sp.*  
No blue metallic markings, the body with very faint general iridescence in a strong light. . . . . *tabascensis*

## 452 CHROSTOSOMA ECHEMUS Stoll

? *Sphinx Adscita echemus* Stoll, in Cramer Pap. Exot. iv, 147, 367: B, 1781.

? *Lamocharis stulta* H.-S. Aussereur. Schm. i, 80, fig. 258, 1854.

? *Glaucopsis (Pheia) dolens* Walker, List Lep. Ins. B. M. i, 148, 1854.

Also *figured:* Seitz 12: k6.

This is a true *Chrostosoma*, though it stands in the U. S. National Museum as *Saurita stryma*. Cramer's figure is very bad, showing a red head; *dolens* Walker has blue lateral spots and under side of abdomen white, while *stulta* is based on a figure alone, which does not show these points, but does show an orange collar and a differently shaped black border. So the name remains uncertain.

Dominant at beginning of Dec. (see diagram, p. 101). *Echemus* was described from Surinam, *dolens* from Para, *stulta* without locality.

### CHROSTOSOMA TABASCENSIS Dyar

*C. tabascensis* Dy. Proc. U. S. Nat. Mus. li, 5, 1917.

The *decisa* group of *Chrostosoma* is a desperate one, that can probably be solved only by much material and genitalic studies. The Panama species differ from true *decisa* and *hæmatica* in having the white on the under side of the male hind wing limited to a subbasal patch on the costa and the costal half of the cell. In typical *tabascensis* there are no blue spots, but in half the present series there are blue spots on various parts of the body. It is not clear whether these are a good species. *C. destriata* Ddt. must be similar, but is described as having the red spot on the metathorax and a white one on first segment of abdomen (like *Saurita phœnicosticta*); *Psilopleura albipes* Ddt. (Seitz 15: c4) must also be similar, but the present lot are true *Chrostosomas*.

Normal form late Oct. and Dec.; blue spotted specimens also in Jan. and July-Aug. *C. tabascensis* is in the National Museum from Mexico and Guatemala.

### COSMOSOMA Hübner

This name was first used by Hübner in the Sammlung Exot. Schm. ii, pl. 369 (Kirby's numbering), was abandoned in the Verzeichniss, but taken up by Harris in 1839 (Silliman's Journal xxxvi, 317). Hampson originally included many species with lobed hind wing that he has since removed to *Gymnelia*, but the genus still includes various lobed species, and needs further revision. It is central for this group, and leads into most of the preceding genera.

The larva of *C. myrodora* has the usual dense tufts on sides of 1st and 8th segments of abdomen, and sparse prothoracic pencils; it feeds on *Mikania*.

1. Discal bar large, centered with scarlet. . . . . *teuthras*  
 Discal bar black and almost always narrow, concolorous with other  
 veins. . . . . 2

2. Abdomen largely yellow, orange or red, at least laterally on first four segments . . . . . 3  
 Abdomen black and blue, at most with orange lateral patches on two basal segments or a middorsal stripe . . . . . 10
3. An irregular middorsal black and blue band; sides of thorax and first four segments of abdomen scarlet . . . . . *auge*  
 Thorax without dark middorsal band, abdomen with a faint fine one or none; blue middorsally on tail only or none . . . . . 4
4. Thorax orange, concolorous with most of abdomen . . . . . *batesi*  
 Thorax yellow on disc, the tegulæ or their outer edges contrasting, black; collar black . . . . . 5  
 Thorax solid black, contrasting with the orange or yellow abdomen . . . . . 6
5. Large, all veins black, tegulæ all black, or with a longitudinal stripe . . . . . *Sarosa innotata*  
 Small; veins antemedially yellow; bases of tegulæ yellow. . . . . *semifulva*
6. End of abdomen black, sometimes spotted with blue . . . . . 7  
 End of abdomen yellow, concolorous . . . . . *hercyna hercynacula*
7. Head and thorax much shaded with bright blue, abdomen orange. . . . . *zucheri*  
 Head and thorax dull black, abdomen yellow . . . . . 8
8. Abdomen with five segments yellow, above and below; white spots if present located on wing-bases . . . . . 9  
 Abdomen with only 4 yellow segments above, six below; white spots on bases of tegulæ; valve long . . . . . *galatea*
9. Small species, discal bar much thickened; border much widened below Cu<sub>2</sub> in both wings; thorax solid black. *h.h. var. melanotela*  
 Larger species; discal bar limited to the angled vein; border nearly even; thorax with several white dots . . . . . *stibostictum*
10. Discal bar very thick; sides of thorax and base of abdomen orange. . . . . *cæcum*  
 Discal bar moderate; no orange subdorsally . . . . . 11
11. Tegulæ with orange stripes; male with a large blackish or orange patch opposite lower angle of cell . . . . . *remotum*  
 Tegulæ with a blue stripe; male without scaled patch between cell and anal angle . . . . . 12
12. Face white; fore wing with the transparent area between Cu and fold extending to base of wing . . . . . 13

- Face blue; fore wing with base solidly black out to  $\frac{1}{4}$  length of cell and bearing a blue spot; subdorsal spots on abdominal segments 2 and 3 enlarged and coppery.....*xanthostictum*
13. Fore wing black and pure transparent (except the blue basal spot); abdomen with a regular series of subdorsal blue patches.  
*metalleseens*
- Fore wing with both membrane and scaled portions scaled or tinted with orange; subdorsal patches on second segment of abdomen much enlarged.....*saron*

GROUP IA. *Stalk of M<sub>3</sub> and Cu<sub>1</sub> almost as long as lower side of cell preceding it, or free part of Cu; abdomen of male with well developed ventral valve (Cosmosoma).*

#### 477 COSMOSOMA AUGE Linnæus

*Sphinx auge* Linn. Syst. Nat. (Ed. 12) i (2) 807, 1767.

*Cosmosoma omphale* Hübner, Samml. Exot. Schm. ii (369), 1823.<sup>1</sup>

Also figured: Holland, Moth Book 13: 1; Seitz 13: c1.

Larva and pupa: (of *C. a. myrodora* Dyar) Dyar, Psyche, vii, 414, 1896; Hamps. 228.

Easily recognized by the scarlet legs and lateral stripes. Larva with black and white hair, on Mikania.

Feb. 24 (Fried.). Lancetilla, Honduras, (Bates). Mexico and Antilles to Uruguay, a race in Florida.

#### 480 COSMOSOMA ZURCHERI Druce

*C. zurcheri* Dr. Ann. Mag. Nat. Hist. (6) xii, 353, 1894.

Figured: Hamps. 8: 19; Seitz 13: d1.

The blue head and prothorax, and decidedly orange hind-thorax and abdomen are distinctive.

Oct. 28 and Jan. 30 (Bts.) Costa Rica.

#### 480c COSMOSOMA GALATEA Schaus

*Cosmosoma galatea* Schs. Ann. Mag. Nat. Hist. (8) ix, 35, 1912.

*Mesothen albifrons* Ddt. in Seitz Macrolep. World 27: h5 (not Schaus).

Also figured: Hamps. Suppl. 8: 8.

This species is very close to *M. albifrons*, having the narrow valve of Mesothen, and a very short cell to the hind wing, but in the unique

<sup>1</sup> Date shown by Hemming, 1937. This is plate 156 of his numbering.



type of *M. albifrons*,  $M_2$  of the fore wing is straight and well separated from  $M_3$ . The white shoulder spots are as in *M. ethela*, but there are additional paired dots on collar and vertex.

Dec. 24 (Bates), 1 ♂. Described from Costa Rica.

*Cosmosoma semifulva* Dr. (Biol. 8: 11) is reported by Dyar from the Canal Zone. It resembles a small *Chrysostola mellita*.

#### GROUP IB. Venation as before; no ventral valve.

##### COSMOSOMA SARON Druce

*C. saron* Dr. Biol. Centr. Am. Het. i, 59, 7: 14, 1884.

*C. meres* Dr. Ann. Mag. Nat. Hist. (6) xviii, 30, 1896.

Also figured: Biol. 71: 23 (as *meres*); Seitz 13: k7.

In typical *saron* (also in the type of *meres*) there are two pairs of orange spots on the abdomen, which are missing on all the Panama specimens, and most of the others seen. The pattern is remarkably like that of *Pheia elegans*, but the cell of the hind wing is a little longer.

Jan. to June (see diagram, p. 101). Described from Chiriqui.

##### 509 COSMOSOMA METALLESCEM Ménétries

*Læmocharis metallescens* Mén. Cat. Lep. Petr. ii, 138, 14: 1, 1857.

Also figured: Seitz 13: k4.

The wing-form leans to *Gymnelia*. It is recognizable by the white spots on front and patches on hoods, and triple series of spots on abdomen.

Chief flight in Jan. (see diagram). Lancetilla, Honduras, (Bates). Mexico to Amazons.

##### 510 COSMOSOMA BATESI Butler

*Dycladia batcsi* Btl. Jour. Linn. Soc. Zool. xii, 394, 1876.

Figured: Hamps. 9: 7; Seitz 13: k5.

Yellow parts decidedly orange; face white.

Feb. 1, Mar. 3, Apr. 26. Ranges to Para and S. Brazil.

##### 515 COSMOSOMA XANTHOSTICTUM Hampson

*C. xanthostictum* Hamps. Cat. Lep. Phal. i, 240, 9: 21, 1898.

*C. metallescens* Dr. (in error) Biol. i, 58, 1884.

Also figured: Seitz 13: 14.

The strongly coppery subdorsal spots on second and third segments

of abdomen are distinctive; the female has a large mass of yellow hair on the under side of the abdomen, which is presumably mixed with the eggs when laid.

Males Oct. to Jan., female Apr. Also taken by Bates at Lancetilla, Honduras. Ranges north to Mexico.

GROUP IIA. *Hind wing with lower side of cell longer, the stem of  $M_3+Cu_1$  being about half as long as cell, and as length of free part of Cu with its branches. Scaling of border of hind wing below rough and slightly raised. No valve.*

#### 531 COSMOSOMA REMOTUM Walker

*Glaucopis (Cosmosoma) remota* Wlk. List Lep. Ins. Br. Mus. i, 170, 1854.

? *C. bolivarensis* Klages, Proc. U. S. Nat. Mus. xxix, 356, 1906.

*Figured:* Hamps. 9: 22; Seitz 14: c6 (♂ only).

In this little group the males have a fully scaled patch opposite the lower angle of the cell. The half dozen nominal species may probably be reduced to one or two; they differ mainly in the amount of orange on body and fore wings; which reaches a maximum in the Pto. Rican *C. achemon tyrrhene* and is absent in *C. centrale* from Brazil. The present form has a blue collar, with a few orange scales at most, *C. festivum* Wlk. is almost identical but with orange collar.

Oct. 26; Jan. to Mar. Ranges south to Venezuela.

GROUP IIB. *Cell large as in IIA; under side of hind wing smooth; valve absent.*

#### 523 COSMOSOMA TEUTHRAS Walker

*Glaucopis (Cosmosoma) teuthras* Wlk. List Lep. Ins. Br. Mus. i, 168, 1854.

*Figured:* Butler Ill. Lep. Het. Br. Mus. i, 13: 5; Hamps. fig. 110; Seitz 14: b2 (typical), 3 (*cingulatum*), 4 (*lignicolor*), 5 (*restrictum*).

The races differ in the amount and shade of the red or orange. Hampson assigns the Panama specimens to the typical (Venezuelan) form, but *C. t. cingulatum*, ranging from Mexico to Veragua (west Panama) is almost the same. Seitz's fig. b2 shows far too much orange on the inner margin.

Dec. to Apr. 5; July. La Venta Farm, Panama (Bts.). The species ranges from Mexico to S. Brazil.

#### 525 COSMOSOMA CÆCUM Hampson

*C. cæcum* Hamps. Cat. Lep. Phal. i, 246, 1898.

*Figured:* Biol. 71: 22 (as *impar* Wlk. in error); Seitz 14: c1.

Border more irregular than in *C. teuthras*, and discal spot large but wholly black (figured by Seitz as with a small red center). Thorax with black and blue middle spots.

Nov., Jan., Mar. also Chiriqui (A.M.N.H.), Lancetilla, Honduras (Bts.). Ranges north to Mexico.

#### 545 COSMOSOMA HERCYNIA HERCYNACULA Dyar

*C. hercynacula* Dy. Proc. U. S. Nat. Mus. xlvii, 161, 1914.

*C. h.* var. *melanotela* Dy. Proc. U. S. Nat. Mus. xlvii, 161, 1914.

Thorax black, the metathorax typically yellow, but black at sides in *h. hercynacula*, leaving the scutellum yellow; abdomen typically wholly yellow, the last two segments black in var. *melanotela*; border of fore wing extending  $\frac{2}{5}$  way in to end of cell (typically narrower).

Dates scattering (see diagram, p. 101). Eleven specimens of v. *melanotela* with 20 of the type. Typical *hercynia* is known from Mexico, Nicaragua, and Lancetilla, Honduras (Bts.); *hercynacula* and *melanotela* were described from the Canal Zone.

#### 547 COSMOSOMA STIBOSTICTUM Butler

*Ilipa stibosticta* Btl. Jour. Linn. Soc. Zool. xii, 391, 1876.

Figured: Hamps. 9: 11; Seitz 14: g5.

The base of the fore wing has a small white spot, and a white speck beyond it.

Nov., Mar. 16, May, June, July-Aug. Honduras (Bts.). Hampson also reports it south to Colombia.

#### RHYNCHOPYGA Felder

Similar to *Saurita*, except that  $M_3$  and Cu of the hind wing are markedly stalked, and the fore wing is much narrower, nearly 3 times as long as wide. In the typical species the anal segment is long and beak-like (whence the name) but the rest of the genus are normal.

I transfer *Saurita cryptoleuca* here with some doubt. It is no *Saurita*, and would run here in a key, but I do not know the male.

1. Neck and collar orange, disc of hind wing transparent... *flavicollis*

Collar with red scales, shoulders and hoods with red dots; disc of hind wing blue.....*cryptoleuca*

#### 596 RHYNCHOPYGA CRYPTOLEUCA Walker

*Euchromia (Pampa) cryptoleuca* Wlk. List Lep. Ins. Br. Mus. i, 239, 1854.

Figured: Hamps. 10: 21; Seitz 15: f1.

The contrasting blue hind wing with a small transparent anal patch is unique in the Euchromiidae. The male may be more largely transparent, but will probably show the same red markings.

July-Aug. (Fairchild) (Banks). Guiana and Amazons.

Dyar reports *R. flavicollis* Druce (Biol. 7: 11). The base of fore wing and most of hind wing are transparent, and there is no red or blue.

SAURITA Herrich-Schäffer (with *Hypocharis* Hampson)

A varied genus, both in structure and coloring, perhaps ancestral to most of the preceding.  $M_3$  is barely stalked or connate with Cu, and the membrane is frequently fully scaled (like *Rhynchopyga*, but unlike most of the preceding). Barro Colorado Id. is relatively rich in species.

1. Thorax solid orange, contrasting with the black scaling of the wings.....2  
 Thorax mostly black.....5
2. First segment of abdomen black; orange parts more yellow; wings broader with normal anal area.....*afflicta*  
 First segment of abdomen at least subdorsally, and base of wings orange, the tint redder; wings narrow with anal region of hind wing reduced.....3
3. Abdomen spotted with blue, the first segment black middorsally, with a blue spot.....*anselma*  
 Abdomen not spotted with blue; first segment solid orange above. 4
4. Head black on vertex and white behind eyes.....*sanguinea*  
 Vertex and head behind eyes both orange, only the anterior head black and white; wings more opaque.....*incerta*
5. Body with red spots.....6  
 Body without red spots.....9
6. Red spots on shoulders, and a middorsal one on first segment of abdomen; hind wing short.....7  
 Red spots on shoulders, vertex and scutellum.....*phænicosticta*  
 Red spots on shoulders and top of tegulae only, no unpaired spots; hind wing long and fully scaled.....*tetramma*  
 Sides of thorax red in front; wings with transparent patches...*mora*
7. Wings transparent with large discal spot; no red spots on dorsum of tegulae.....*Chrostosoma echemus*  
 Wings slightly translucent; the hind wing with fine even modified scaling, except along costa; tegulae with red dorsal patches....8

8. Smaller; body marked with blue.....*clusia*  
 Larger, no blue.....*nox*  
 9. Fore wing black, hind wing blue.....*Rhynchoyga cryptoleuca*  
 Wings translucent between veins, all black.....*tipulina*

GROUP I. *Hind wing rather narrow, with normal anal area; hind tibia with upper spurs rudimentary; male (unknown in present species) with ventral valve* (Saurita).

#### SAURITA TETRĒMA new species

Similar to *Saurita cassandra*. Smaller, darker, dull dark brown, wholly without blue markings; the dark veins and shadings not contrasting, but with perceptible darker shades over end of cell and near apex of fore wing and near apex and anal angle of hind wing. Palpi wholly black. The only contrasting markings are two crimson spots on each tegula, on shoulder and along upper edge.

The 7 specimens are all females, but in this group the sexes are similar. The species will key in Hampson to *S. mora* Druce, but looks entirely different. 25mm.

Barro Colorado Id., Panama, holotype Nov. 23, 1924, (Bates); paratypes from the same place, Nov. 19-Jan. 29 (Bates).

GROUP II. *Hind wing nearly as broad as long, ample, the scaling fine, even and spaced, except along costa and upper half of cell where it is normal; hind tibiæ normal; no valve* (Hypocharis).

#### 593 SAURITA CLUSIA Druce

*Læmocharis clusia* Dr. Ann. Mag. Nat. Hist. (6) xx, 303, 1897.

*Figured:* Hamps. fig. 125; Seitz 15: e5.

Hampson proposed the genus *Hypocharis* for this species alone, but the venational difference given is imaginary, all the species having  $M_1$  more or less separate from upper angle of cell. *Clusia* is smaller than *nox*, the white postmedial band is narrower sex for sex, and the blue spotting is distinctive.

Dominant in Dec. (see diagram, p. 101). Described from the Amazons.

#### 606 SAURITA NOX Druce

*Læmocharis nox* Dr. Ann. Mag. Nat. Hist. (6) xviii, 30, 1896.

*Figured:* Biol. 71: 11; Seitz 15: g7 (unrecognizable, perhaps based on a specimen of *S. fumosa*).

There are no blue spots; in the male the white area invades the outer

third or half of the cell, in the female the extreme apex of the cell may be pale.

Two heavy flights, Oct. and late Dec. (see diagram, p. 101), commoner than *S. clusia*. Lancetilla, Honduras (Bts.), Venezuela.

GROUP III. *Hind wing normal, narrow, with the anal region a little reduced in width, but basal part of inner margin strongly convex; spurs normal, no valve* (Echoneura).

#### 604 SAURITA MORA Druce

*Dycladia mora* Dr. Biol. Centr. Am. Het. ii, 348, 72: 8, 1897.

Also figured: Seitz 15: g4.

The present specimen like the type is a female. Inner margin of hind wing somewhat reduced; upper spurs rather short. Black; body marked with blue and white, fore wing with two, hind wing with one transparent patch, both divided by black veins.

Dec. 29, 1928 (Curran — Am. Mus. Nat. Hist.). Chiriqui (type).

#### 607 SAURITA PHENICOSTICTA Hampson

*Læmocharis trigutta* Dr. Biol. Centr. Am. Het. i, 55 (not Walker).

*S. phænicosticta* Hamps. Cat. Lep. Phal. i, 277, 10: 17, 1898.

Also figured: Seitz 15: g6 (unrecognizable).

Differs from all our species of *Saurita* by the half-scaled wings, with thickened discal bar. Seitz's figure indicates a much too transparent form.

Dominant in Dec.-Jan. (see diagram). Lancetilla, Honduras (Bts.), Guatemala (Type).

#### 608 SAURITA INCERTA Walker

*Tipulodes ? incerta* Wlk. List Lep. Ins. Br. Mus. vii, 1627, 1856.

Figured: Felder Reise Novara Lep. 102: 23 (as *corallonota*); Seitz 15: h3.

Fore coxæ of male white; translucent areas diffuse, in and below cell. 22mm.

Feb. 8, June 13, July (Banks). Jan. to July; also Colombia.

#### 610 SAURITA SANGUINEA Druce

*Thrinacia sanguinea* Dr. Biol. Centr. Am. Het. i, 56, 7: 9, 1884.

Also figured: Seitz 15: h5.

Head black and white without any red. Fore coxæ mostly black in



both sexes. Slightly larger (28 mm.); transparent area less diffuse, and usually more extensive, with a small separate spot in fork of Cu.

Nov. 24, Jan. 28 (Bts.), Mar. 12 (A.M.N.H.). Guatemala (types).

#### SAURITA ANSELMA Schaus

*Saurita anselma* Schs. Proc. U. S. Nat. Mus. lxx, (7) 8, 1925.

Larger and heavier, with the transparent areas larger and more sharply bounded, frequently with spots beyond cell.

Dominant flight in Jan. (see diagram, p. 101). Described from the Canal Zone.

#### 615 SAURITA AFFLICTA Walker

*Saurita temenus* auct. not Stoll.

*Glaucopis (Pseudomya) afflictata* Wlk. List Lep. Ins. Br. Mus. i, 144, 1854.

*Saurita venezuelensis* Klages, Proc. U. S. Nat. Mus. xxix, 538, 1906.

*Figured:* Butler, Ill. Lep. Het. Br. Mus. i, 7: 12; Seitz 16: b1.

The whole head and under side is black, unlike true *temenus*. The yellow at the wing base is much reduced, and the whole moth is softer looking than the preceding; the male is solid black on outer half of wings, the female translucent almost to the margin.

True *S. temenus* of Stoll has the under side of the body yellow, and the wings more transparent, the male being about like female *afflictata*.

Dominant in Dec. (see diagram). Lancetilla, Honduras (Bts.) to Amazons, common.

#### 622 SAURITA TIPULINA Hübner

*Glaucopis unicolor tipulina* Hüb. Samml. Exot. Schm. i, 163 (Kirby's numbering), 1812.

Also *figured:* Butler Ill. Lep. Het. Br. Mus. i, 7: 7; Seitz 15: k2.

Wholly black, otherwise like *S. afflictata*, but the male wings more translucent, as in female *afflictata*.

Jan. 25, Feb. 5, Mar. 4, Apr. 5. Guatemala to Southern Brazil.

#### PSOLOPTERA Butler

A variant of *Saurita*, differing only in  $R_2$  being stalked with  $R_1$  instead of  $R_{3-5}$ .

#### 629 PSOLOPTERA THORACICA Walker

*Euchromia (Autochloris) thoracica* Wlk. List Lep. Ins. Br. Mus. i, 243, 1854.

*Figured:* Butl. Ill. Lep. Het. Br. Mus. i, 8: 6; Seitz 15. m4.

Black; with scarlet vertex and thorax, blue subdorsal points on first segment of abdomen and two on base of fore wing.

All the year round, the heaviest flight in April (see diagram, p. 101). Guatemala to Amazons.

#### DYCLADIA Felder

This genus and *Histiæa* represent the true *Euchromia* group. The wings are rather acute, and the patterns conspicuous.

1. Wings less transparent; apical patch of fore wing some three times diameter of discal spot; a black patch between discal spot and anal angle. . . . . *correbioides*
- Wings more transparent; apical patch less than twice diameter of discal spot, which is connected with anal angle by only faint traces of dark shading. . . . . *vitrina*

#### 649 DYCLADIA CORREBIOIDES Felder

*D. correbioides* Fld. Reise Novara Lep. 102: 20, 1874.

Also figured: Hamps. fig. 136; Seitz 16: d5.

The resemblance to *Correbia* and *Correbidia* is striking, in fact the specimens were received mixed with members of those two genera. Probably all three, and *Lycomorphodes* of the *Lithosiinæ* as well, are mimics of *Lycidæ*.

Jan., Feb., Mar., Apr., July-Aug. (see diagram). Mexico to Colombia.

Dyar described *D. manha* (a synonym of *vitrina* Roth., Nov. Zoöl. xx, 13: 35) from the Canal Zone. It ranges from Honduras (Bates) to Ecuador (type).

#### MACROCNEME Hübner

This genus is the *Euchromiine* member of a very distinctive group of black and green moths, frequently with enlarged hind legs, which presumably mimic certain *Vespidæ*. Others are *Horama*, *Calonotos*, *Ceramidia*, *Antichloris* and *Amyces*.

A few of the species of *Macrocneme* have  $R_2$  more or less constantly free, and intergrade with the second group of *Calonotos*; in the latter  $M_2$  and  $_3$  are closely parallel for a distance beyond their origin. The leg characters used by Hampson for grouping are partly imaginary; the white spotting of the first segment of abdomen and male valve and genitalic type make a better separation. The genitalia must be viewed from various sides to be properly understood, so cannot be mounted on slides; it is usually possible to draw them out with a hook, so as to

display all the essential features (especially when fresh). They are so heavily chitinized that there is no substantial distortion. As the genitalia have not yet been studied on authentic specimens, and the superficial characters are weak or even nil, the following determinations are subject to correction.

Larva of *M. leucostigma* dark with sky blue warts (Jørgensen).

In the following key I have included several species not actually known from Panama, where it seemed worth while to note their characters. It will apply only to males, and should be used in connection with the genitalic figures. The green patterns are distinctive in some cases, but so variable that they cannot be clearly described.

1. Abdomen with a pair of white spots on first tergite, the blue spots on hoods less conspicuous; male without ventral valve on first segment; the genitalia with large bifid valves, nearly symmetrical, scoop-like juxta, and fairly simple uncus, the juxta and uncus somewhat unsymmetrical as a rule; female antennæ narrowly pectinate (*Macrocneme*).....2

Abdomen without a pair of white spots on first tergites, though sometimes with blue-white spots on hoods; male with small ventral valve, usually white-edged; genitalia highly unsymmetrical so far as examined; valves simple, the right one much larger and farther ventrad than the left; tegumen frequently with a large process on right side and juxta massive; female antennæ simple, fusiform.....8

2. Fore wing with iridescence covering most of surface, varying in color to blue and even purple, normally extending broadly and evenly at least half way from cell to apex; male hind tarsus normally with a single white segment, female wholly black.

*cyanca*, *adonis*, *maja* Hbn. not F.

Iridescence of fore wing usually evenly colored, green, rarely even brassy; usually not extending far beyond cell, or with a black ray extending in to cell.....3

3. Juxta long, but abruptly narrowed from right side at half its length to half its width (fig. 7). Green of fore wing solid to middle, with faint traces only of a darker interruption in fold; very glossy; tip of hind tarsus white.....*aurata* (*semiviridis*)

Juxta gradually though unsymmetrically tapering to a pointed or truncate apex; green of fore wing interrupted antemedially at least by a heavy oblique black bar in fold, frequently divided into several spots.....4

4. Juxta enormous, when everted extending beyond all other structures, at rest upturned behind the other structures and covering the uncus, pointed and twisted; under side of hind wing green only along costa; hind tibia all black. . . . . *cinyras*  
Juxta scooplike, truncate, shorter than valves. . . . . 5
5. Hind tarsus all black, under side of hind wing mostly green; green area of fore wing rather broad and even, not ragged or interrupted, usually with some brassy tint. . . . . *chrysitis* (*iole*)  
Hind tarsus with white tip; green area of fore wing not brassy, with ragged outer boundary or more or less interrupted with black. . 6
6. Under side of thorax and abdomen dominantly white, the white stripe extending broadly to its tip. . . . . *thyra* (*albiventer*)  
Under side of thorax with large white spots, of abdomen with broad white stripe toward base, narrowing and breaking into small spots toward apex, the terminal segments black. *thyra*, var.  
Under side of body with small white spots only, black. . . . . 7
7. Upper side of uncus broad; with one or two unsymmetrical keels on its dorsal surface, besides the lateral keels; valve simple (Brazil). . . . . *leucostigma*.  
Upper side of uncus less broad, with the two lateral keels only, the middle forming a flattened dome; valve simple, collar with two pairs of small white spots. . . . *thyridia* (*euphrasia*, *guyanensis*)  
Upper side of uncus as before, the lateral keels much inflated; valves with a sharp tooth on upper inner edge (fig. 8) collar with the two white spots large and connected in front. . . . . *sp.*
8. Abdomen above with three rows of large green spots; larger species, genitalia apparently more massive. . . . . 9  
Abdomen above solid green, or with brighter lines on a deeper green or blackish ground; valves slender, the left one very small. 10
9. First segment of abdomen above red. . . . . *apollinairei*  
First segment of abdomen above bright yellow. . . . . *xantholopha*  
First segment of abdomen above black. . . . . *cyanescens*
10. Disc of hind wing translucent, at least in male; uncus slender and merely hooked, right process of tegumen also slender. . . . . 11  
Hind wing evenly scaled, like fore wing; uncus so far as examined sharply bent or T-shaped; right lobe of tegumen stout when present. . . . . 12
11. Markings of body underlain with yellow, appearing coppery to some extent. . . . . *laciades*  
Collar with large bright yellow spots. . . . . *misitra*

- Without distinct yellow markings, marked with white. . . . .*laconia*
12. Hind tarsus largely bright yellow. . . . . 13  
 Hind tarsus with terminal segments white. . . . . 15  
 Hind tarsus wholly black. . . . . 22
13. Fore wing almost all black, with a wedge-shaped green dash in base of fold; larger (40 mm.); valve edged with white. . . . .*jalapensis*  
 Fore wing with a median green shade of variable size resting on costa; generally smaller (30 mm.). . . . . 14
14. Valve entirely black; a separate green streak along upper edge of anal vein from base nearly to outer margin. . . . .*chrysotarsia*  
 Valve with white edge; no green above anal vein, or a vague median streak in specimens with the other green median shades large. . . . .*auripes*
15. Uncus of male T-shaped. . . . . 16  
 Uncus of male merely sharply bent down; tegumen with a large right lateral process (in the position of the upper lobe of the valve in the first group). . . . . 17
16. Ventral valve of abdomen solid black; tegumen without any lateral process; median green area dim, diffuse except on the fine black veins, nearly as strong below A as above. . . . .*sura*  
 Ventral valve with strong white edge (at least partly); green of median area brilliant, costal, the inner margin being solid black or at most with a few scattered green scales; lateral process small, far down on side. . . . .*cyllarus*
17. Fore wing with green confined to the basal spots; abdomen below without subventral white dots. . . . .*albitarsia*  
 Fore wing green on median area, at least toward costa. . . . . 18
18. Under side of abdomen without white markings. . . . .*esmeralda*  
 Under side of abdomen with white edge of valve and subventral dots. . . . . 19
19. Upper side of abdomen suffused with metallic green, the stripes visible only at base. . . . . 20  
 Upper side of abdomen dull blackish in usual lighting, with narrow dorsal and lateral green lines. . . . . 21
20. Green on median area bright, streaky, more or less confined to costal portion. . . . .*indistincta*  
 Green less brilliant, very smooth and diffuse, strong (except on veins) to inner margin. . . . .*hampsoni*
21. Fore wing with median green area extensive, with a (usually separate) streak above A. . . . .*alesa*  
 Fore wing with median green confined to costal half or less. . . . .*vittata*

- Fore wing with green less brilliant, and diffuse, covering practically whole width of wing. . . . . *ockendeni*<sup>1</sup>
22. Apical area of fore wing heavily shaded below, and faintly above with white, between veins (♀). . . . . *hesione*
- Apical area black like rest of wings. . . . . 23
23. Green areas of fore wing brilliant, tending to form median streaks between veins. . . . . *nigritarsia*
- Green of fore wing diffuse and faint, except the usual small basal spots. . . . . *ecacus*

## [698 MACROCNE ME ADONIS Druce

*M. adonis* Dr. Biol. Centr. Am. Het. i, 48, 6: 16, 1884.

Also figured: Seitz 17: b2.

In all the males of this coloring, which I have seen, whether determined as *adonis*, *cyanea* or *maja*, the last segment of the tarsus is white, in the corresponding females it is black.

Range uncertain. *M. adonis* was described from Panama, *cyanea*, which should have a little wider black apex, from Rio and *maja* Hübner (in error) also presumably came from Rio. Hampson reports *adonis* from as far north as Cordova, Mexico.]

## [739 MACROCNE ME AURATA Walker

*Euchromia (Macrocneme) aurata* Wlk. List Lep. Ins. Br. Mus. i, 250, 1854.

*M. semiviridis* Dr. Ann. Mag. Nat. Hist. (8) vii, 287, 1911.

Figured: Hamps. fig. 155, Suppl. 11: 5 (as *semiviridis*); Seitz 18: b4, 28: f3 (as *semiviridis*).

Hind legs much broadened (Macrocneme, not Calonotos), with strong white tips. Easily distinguished from most other Macrocnemes by the very even and brilliant green patch, ending abruptly and not interrupted subbasally, the hind wing mostly green. The male genitalia (fig. 7) with left edge of juxta drawn out into a long process.

Chiriqui, Panama to Rio; a specimen from Chiriqui (Cornell) figured.]

## [699 MACROCNE ME CINYRAS Schaus

*M. cinyras* Schs. Ent. Am. v, 88, 1889.

Figured: Biol. 71: Seitz 17: b2.

<sup>1</sup> Not examined, this form may prove conspecific with *M. sura*.



The Seitz figure is good. The male characteristically shows the green divided into four patches by a broad black band from near base of inner margin through cell to the black apical area crossed by one from costa near base along fold to the black apical area. When reduced the green still tends to show the same four areas. Genitalia unique (fig. 1) as indicated in key. I am uncertain of the female; Schaus had associated it with *adonis* but I think the latter belongs with the northern *cyanea*-like males that have a minute white tip to hind tarsus. The National Museum have a single female with the male pattern but more extended which is certainly correct, and others may be confused with *adonis*, but should differ in having the green areas all of one shade.

Mexico (type) and Central America. Tela, Honduras, Mar. 1936 (Deal) and Mackenzie, British Guiana (Forbes) in Cornell.]

#### 700 MACROCNEME CHRYSITIS Guérin

*Glaucoptis chrysitis* Guér. Icones Règne Anim. Ins. 502, 1844.

Figured: Biol. 6: 17 (as *iote*); Seitz 17: b4.

Green area on fore wing above with even transverse outer boundary before end of cell (not well shown in Seitz), extending except for fine black veins from costa to inner margin, interrupted with black near base (heavily in ♀). The band is usually brassy but clear green in the two Panama females at hand. Male genitalia normal for the group (fig. 2) juxta long, tapering to less than half its width at tip, and heavily spinulated.

Mar. 3 (Friedman), Mar. 9 (A.M.N.H.). Ranges north to Mexico. Hampson also reports this from southern Brazil, but the records should be verified.

In this species the under side of the hind wing is mostly green, as also in *M. thyra* and its Panama representative, — in *M. cinyras* it is confined to a costal stripe. *M. leucostigma* and *thyridia* tend to be intermediate, but vary.

#### 704 MACROCNEME THYRA Möschler

*M. thyra* Msch. Verh. z.-b. Ges. Wien. xxxii, 334, 18: 24, 1883.

*M. albiventer* Dgn. Het. Nouv. xxiii, 2, 1923.

Also figured: Seitz 17: c1.

In the typical male this species is easily recognized by the almost wholly white under side; there is a form in which the white is less ex-



tensive, but the genitalia are essentially the same. The type form is before me in series from eastern Peru. Types of both names were the white phase from Guiana. Other specimens from Guiana, and the only one at hand from Panama have the white limited to the base of abdomen and only spots on the thorax, though much larger ones than in thyridia. Female indistinguishable from *thyridia* and *leucostigma*. Male genitalia (fig. 3) with juxta relatively short, squarely cut off basad of the point of origin of lower lobe of valve; left upper lobe of valve with a more or less distinct tooth on upper inner edge before tip.

Range uncertain, typical males seen from Guiana and Peru, dark ones from Guiana and Panama (Barro Colorado Id., Mar. 4, Apr. 10, Friedman).

### 705 MACROCNEME THYRIDIA Hampson

? *Zygana maja* Fabr. Mant. Ins. ii, 106, 1787.

*M. thyridia* Hmps. Cat. Lep. Phal. i, 321, 11: 9; 1898.

*M. lades* Hmps. Cat. Lep. Phal. i, 317, 1898 (in part, not Cramer).

*M. guyanensis* Dognin, Hét. Nouv. ii, 6, 1911.

*M. lades cabimensis* Dyar, Proc. U. S. Nat. Mus. xlvii, 162, 1914.

*M. euphrasia* Schs. Proc. U. S. Nat. Mus. lxxv, (7), 10, 1924.

Also figured: Seitz 17: d1.

The list of names is mainly due to variability in the amount of green, the median fascia being normally nearly complete, transverse and moderate; very narrow in *cabimensis* and mostly on inner margin in *guyanensis*. *M. cabimensis* may possibly belong to the preceding as the types are female, and both species have forms with very narrow green bands. The abdomen is sometimes strongly coppery, as in Seitz's figure, but I think this is due to age, all the fresh specimens seen having green abdomens. Male genitalia (figs. 4 and 5) with scoop extending rather beyond base of lower lobe of valve, narrowed and obliquely truncate. Uncus variable in detail, but always with a rounded central dorsal area and a pair of lateral flanges, the right one generally stronger. Left valve without inner tooth, rounded at tip.

Mar. 25, Apr. 23 (Fried.) July 10 (Banks). Honduras to Guiana and Amazons.

### [696 MACROCNEME LEUCOSTIGMA Perty

*Gnucopis leucostigma* Pty. Del. Anim. Art. 158, 31: 11, 1834.

*M. ferrea* Btl. Jour. Linn. Soc. Zool. xii, 371, 1876.

*M. lades* Hamps. Cat. Lep. Phal. i, 317, fig. 145 (in part, not Cramer).

Larva: Jörgensen, Zeits. Wiss. Ins.-biol. ix, 74; Hamps. Suppl. 205.

Almost identical in pattern and genitalia with the preceding, (fig. 6), but with one or two keels on middle portion of uncus instead of a rounded area. The left keel is constant, the right one weaker than the left and occasionally absent.

This may be the true *M. maja* of Fabricius, as the description fits and he had southern Brazilian material. More probably it was the preceding, or one of two or three still obscure related types. It is not *lades*, which had only a single small basal green spot, and the abdominal pattern of the second group.

Seen only from Southern Brazil and Paraguay.]

(*M. CYANESCENS* Dgn., *XANTHOLOPHA* Schs., *APOLLINAIREI* Dgn.

These three species are closely related, and belong to the second group, with ventral valve and without dorsal spots on first segment. They differ in small points of coloring only, and I suppose are closely related, perhaps merely color forms. Genitalia not examined, but apparently with simple, rather heavy valve. All are from Colombia).

#### 701 MACROCNEME LACONIA Druce

*Callicarus laconia* Dr. Biol. Centr. Am. Het. i, 49, 6: 18, 1884.

Also figured: Seitz 17: b3; Hmps. fig. 146.

Green scaling on fore wing (except for basal spots) sparse and slight; uncus simply hooked. The female hind wing is fully scaled and I do not know how to distinguish it from *M. nigratarsia*. Hind tarsus black or partly yellowish.

Culebra, Jan., 1915, (Am. Mus.) Central America, type from Yucatan.

*M. misitra* and *laciades* have the same genitalia so far as can be seen, and may be merely color forms (see key). Both are from southern Mexico.

#### [710 MACROCNEME JALAPENSIS Schaus

*M. jalapensis* Schs. Ent. Am. v, 89, 1889.

Figured: Biol. 71: 7; Seitz 17: d3.

Differs from the remaining species with yellow tarsus in the absence of median green.

Mexico and British Honduras.]

## 709 MACROCNEME AURIPES Walker

*Euchromia* (*Macrocneme*) *auripes* Wlk. List Lep. Ins. Br. Mus. i, 250, 1854.

*Figured:* Butl. Ill. Lep. Het. Br. Mus. i, 8: 4; Biol. 6: 15; Seitz 17: d4.

Very close to *M. nigritarsia* and *cyllarus*. Uncus bent a right angle, (fig. 9) but not T-shaped; right lobe of tegumen broad-triangular.

Flight scattering (see diagram, p. 101). Ranges north to Guatemala.

## [711 MACROCNEME CHRYSOTARSIA Hampson

*M. chrysotarsia* Hmps. Cat. Lep. Phal. i, 324, 1898, 12: 22.

Also *figured:* Seitz 17: d5.

Differs most conspicuously in the different green pattern, (not clear in the Seitz figure). The wings also seem thinner.

Taboga Id., Panama (type). Ranges to Venezuela (Nat. Mus.)]

## [714a MACROCNEME SURA Schaus

*M. sura* Schs. Jour. N. Y. Ent. Soc. ix, 42, 1901.

*Figured:* Hamps. Suppl. 11: 8; Seitz 28: f9.

Green fairly bright, but without sharp outer boundary, and cut by the usual black veins. Male genitalia not strikingly different from *M. cyllarus* (fig. 13). I have received this under a ms. name, credited to Schaus, but believe it was not described.

Southern Brazil.]

## 718b MACROCNEME CYLLARUS Druce

*M. cyllarus* Dr. Ann. Mag. Nat. Hist. (6) xviii, 29, 1896.

*Figured:* Biol. 71: 2.

This is superficially identical with *M. indistincta*, and was originally sunk to it by Hampson, but differs in the T-shaped uncus. (fig. 12). *M. indistincta* is from Colombia.

Flight scattering (see diagram). Ranges north to Mexico.

## [716 MACROCNEME ALBITARSIA Hampson

Possibly *Sphinx lades* Cramer, Pap. Exot. i, 83: E, 1776.

*M. albitarsia* Hmps. Cat. Lep. Phal. i, 325, 1898, 12: 6.

Also *figured:* Seitz 17: e3.

This may be the true *M. lades* of Cramer, which had a similar solid black fore wing with green basal spot only and must have belonged to this group. More probably it is a distinct species. Male genitalia, fig. 14.

Venezuela, Guiana and Amazons.]

[715 MACROCNEME ESMERALDA Butler

*M. esmeralda* Btl. Jour. Linn. Soc. Zool. xii, 371, 1876.

Figured: Hamps. 12: 4; Seitz 17: c2.

Distinguished by the solid black color, with diffuse green on fore wing and white tip of hind tarsus only. The specimens at hand from Panama with this determination (in the Nat. Mus.) have white abdominal markings and black hind legs, and are doubtless females of *M. nigratarsia*.

Guiana and Amazons.]

712.1, 712a MACROCNEME HAMPSONI Schrottky

*M. indistincta*, ab. 1 Hmps. Cat. Lep. Phal. i, 324, 1898.

*M. hampsoni* Schrot. Iris xxiv, 151, 1910.

The Panama record is based on two females, which may be really suffused specimens of *cyllarus* or *laconia*. The true *hampsoni* was described from southern Brazil.

Apr. 1, 1927 (Frost, Nat. Mus.), Panama City (Shannon, N. M.), Panama (?) (Cornell), all females.

[713 MACROCNEME ALESA Druce

*M. alesia* Dr. Proc. Zool. Soc. 1890, 493.

Figured: Hamps. 12: 3; Seitz 17: d7.

A representative of the preceding, with dull black abdomen.

Venezuela to Bolivia and Para. A male in Cornell was received with Panama material. *M. vittata* Walker is a closely related species, covering Panama in its range. It has less green.]

717 MACROCNEME HESIONE Druce

*M. hesione* Dr. Ann. Mag. Nat. Hist. (6) ii, 239, 1888.

Figured: Biol. 71: 3; Seitz 17: f2.

Only females are known, and this is presumably a dimorphic form of some other species, possibly *eacus*.

Jan. 28 (Bts.) Chiriqui (type).

#### 718 MACROCNEME NIGRITARSIA Hampson

*M. nigratarsia* Hmps. Cat. Lep. Phal. i, 326, 12: 24, 1898.

*M. vittata* Druce, Biol. Centr. Am. i, 48, 1884 (not Walker).

Also figured: Seitz 17: e6.

Wings with green pattern exactly as in *M. cyllarus*, and varying in the same way, but abdomen blackish with fine green lines only. Male genitalia as in *cyllarus* but right lobe of tegumen slenderer. (fig. 11).

Dec. 23 (Bts.). Mexico to Trinidad (Hmps.). Seen only from Honduras to Venezuela.

#### [719 MACROCNEME EACUS Stoll

*Sphinx eacus* Stoll in Cramer Pap.; Exot. iv, 129, 357: B, 1781.

Also figured: Seitz 17: e1.

Differs from the other small Macrocnemes by the light and diffuse green scaling, and black body, except for the usual small green basal spots. Male genitalia (fig. 10), much as in *M. nigratarsia*, the lateral lobe perhaps even longer.

Guiana and Amazons.]

#### CALONOTOS Hübner

Very close to *Macrocneme*, differing in the more closely parallel  $M_2$  and  $M_3$  of fore wing and simple hind tibia.

#### 734 CALONOTOS TIBURTUS Cramer

*Sphinx tiburtus* Cr. Pap. Exot. iii, 75, 237: C, 1780.

Also figured: Seitz 17: i4 ♂, 5 ♀; Hamps. fig. 154.

Abdomen except first segment, striped with copper and black. In the male there is one outer spot on fore wing, or a second small one, in the female two equal spots. The male crumples the fore wing at rest, so that it appears notched, but the border is actually even.

Chief flight in Feb. (see diagram, p. 101). Costa Rica to Guiana.

## Subfamily CTENUCHINÆ

In this group there is little tendency for  $Cu_1$  and  $Cu_2$  to be stalked or even approximate, and  $M_2$  is never atrophied. In a few cases  $M_2$  is stalked with  $M_3$  or even lost by fusion, but in that case  $Cu_1$  and  $Cu_2$  are always widely separated. The usual Euchromiine larva, with heavy lateral pencils on 1st and 8th segments of abdomen, occurs here, but as often these pencils are absent. The *Ctenucha* group have a row of short dorsal pencils, like the *Phegopterini*.

Generic groups are not yet clearly defined, but there is a transparent winged type (*Argyroides* and *Dinia*), groups centering around *Ceramidia*, *Napata* and *Ctenucha*, and a primitive type with the base of Sc preserved (*Eucereon*, *Episcepsis*, etc.) the latter not grouped in our present arrangement. The *Horamã* group (with  $Cu_1$  and  $Cu_2$  stalked) have not yet been taken in the Zone.

## DINIA Walker

A striking little type, sometimes abundant locally. There are three closely related species, all with transparent fore wings with slender border and veins and heavier discal bar, and broad round hind wing with wide border. Cocoon on a twig, protected by palisades of the larval hairs.

## 746 DINIA MENA Hübner

*Eunomia mena* Hübn. Samml. Exot. Schm. ii, 368 (Kirby's numbering), 1823. Also figured: Seitz 18: c2.

Smaller and more delicate than *D. wagrus*, with a variable amount of red at base of fore wing and very little or no blue.

Feb. 6, 12 (A.M.N.H.), July-Aug. (Fairchild). Ranges south to Argentina.

## TRICHURA Hübner

The general body shape and coloring suggest the *Polistes*-*Polybia* type of wasps, but the long anal process of about half the species is more ichneumon-like.

The American Museum of Natural History has two species from the Canal Zone — *T. latifascia* Wlk. (*ismene* Mösch.), with faintly yellow wings, heavy discal bar and long anal process in male, and *T. druryi* Hbn. with deep yellow wings, linear discal bar and no anal process.

## MARECIDIA Schaus

Hampson's characterization (Suppl. p. 256, fig. 37) is not wholly accurate. The peculiar shape of the body suggests close connection with *Trichura*.

Antennæ prismatic, the shaft much widened on middle portion; palpi upturned, with third joint tapering, short and porrect (suggesting *Ciseps*).<sup>1</sup> Hind tibia of male much enlarged, with a scale-tuft on inner face, of female normal; abdomen somewhat constricted on third segment, with a pair of terminal tufts but no lateral ones. Fore wing fully scaled, narrow-triangular, with  $R_5$  stalked only a little beyond  $R_2$ ,  $M_1$  well separated,  $M_2$  a little separated from the connate  $M_3$  and  $Cu_1$ ,  $Cu_2$  far back; hind wing very small, less than half as long as fore wing, with anal area reduced and transparent;  $R$  and  $M_1$  connate (stalked according to Hampson in *M. sanguipuncta*)  $M_2$  a little separated,  $M_3$  and  $Cu_1$  connate,  $Cu_2$  more than  $3/4$  way out on the short cell.

The two species are closely related, but the fore wing of *M. sanguipuncta* is brilliant green.

## MARECIDIA ACHRYSA new species

Similar to *M. sanguipuncta* Schs., but the fore wing dull, and the red spots much larger.

Black; head and palpi dull green; thorax with large dull green patches on collar, shoulders, tegulæ above and scutellum, the patches not quite meeting; abdomen with a double dorsal series of large patches; terminal tuft and under side with iridescence deeper, bluer, less bright and diffuse. White spots on fore coxæ, hind (but not middle) trochanters, tips of hind femora, sides of metathorax, — venter of first three segments of abdomen white, followed by white spots in male, the spot on 7th segment larger in male or alone present in female. Fore wing above deep black, with a green basal spot only, a deep crimson elliptical spot below cell, extending from  $1/5$  to  $3/5$  the distance to the fork of  $Cu_2$ ; hind wing with costal half covered with dull brown sex-scaling in male, the female with a whitish spot in cell; scaling becoming sparse dorsally; the inner margin transparent. Under side of fore wing above fold and most of hind wing suffused with deep iridescent blue; a red spot on upper outer part of hind wing. Femora and tibiæ deep green, tarsi dull black. 30 mm.

<sup>1</sup> *Scepsis* Walker 1854, not 1850.



Barro Colorado Id., Panama, May, 1, 2, 28, June 6, 24, Dec. 31 (types in Museum of Comparative Zoölogy), Nov. 22, Feb. 11, Mar. 14, (Am. Mus. Nat. Hist.).

*Æthria sarcosoma* Butler is represented in the M.C.Z. from Taboga Id., and in the American Museum from Ancon, C. Z. It is much like *Dinia*, but smaller, with the whole outer part of the abdomen dominantly carmine.

### ARGYROEIDES Butler

A genus of small, extremely wasp-like, moths. They are superficially identical with the first group of *Euchromiinae*, but differ in the free  $Cu_2$ , and also in the formation of the waist, where the second segment as well as the first is involved, and the tympanic hoods are not modified.

1. Black, the constricted part of abdomen moderately narrowed, pale yellow..... *minuta*  
Black and yellow in fairly equal proportions, striped, the waist extremely narrow..... *menephron*

### 781 ARGYROEIDES MENEPHRON Druce

*A. menephron*, Dr. Biol. Centr. Am. Het. i, 65, 8: 14, 1884.

Also figured: Seitz 19: a5.

Wings transparent, yellow tinted; costa fully scaled. Orange streaks on costa and shaft of antenna.

Jan. 13 (Bates), June 18 (Friedman). Described from Panama.

The American Museum has *A. minuta* Dr. (Biol. 72: 3; Seitz 19: c3) from Corozal, C. Z. (Curran), and the National Museum from Tabernilla.

### HYPOCLADIA Hampson

Superficially like *Delphyre*, but the wings more pointed, and with no trace of the rudimentary *Sc* so common in the *Eucereon* group.

### 800a HYPOCLADIA RESTRICTA Hampson

*H. restricta* Hmps. Ann. Mag. Nat. Hist. (7) viii, 172, 1901.

Figured: Hamps. Suppl. 12: 5; Seitz 28: i4.

The red lateral stripe runs from the prothorax under the base of the wings across the first abdominal segment (not the first two as Hampson

states). *H. militaris* Btl. from the Amazons is closely related, but the red stripe is longer.

Principal flight at end of Jan. (see diagram, p. 101). Only known from the Canal Zone; the other two species of this group are apparently equally restricted, *parcipuncta* from Guiana, and *militaris* from the Amazon.

#### EUMENOGASTER Herrich-Schäffer

Near *Chrysostola* but with basal half of *third* segment rather strongly constricted and marked with white; the wings more pointed. The following species appears in Hampson as a *Chrysostola*.

#### 840 EUMENOGASTER MOZA Druce

*Argyroeides moza* Dr. Ann. Mag. Nat. Hist. (6) xviii, 32, 1896.

*Figured:* Biol. 72: 4; Seitz 19: k7.

Black with white spots on body and red terminal tuft; wings deeper yellow than in *Chrysostola*, with scarlet costal stripe.

Jan. 5 (Bts.) Feb. 16, Mar. 17 (A.M.N.H.) 21 (Fried.), July 15 (Banks). Described from Chiriqui.

#### METASTATIA Butler

A broader winged type than the neighboring genera, with waist not narrowed, — presumably modified by mimicry of the *Ithomiinæ*. Hind tibia swollen, but less than in *Marecidia*.

#### 823 METASTATIA PYRRHORHEA Hübner

*Hipoerita chrysorrhea* Hübner, Erste Zutr. (nomen nudum validated by publication of the Zuträge figure before 1814).

*Hyelosia pyrrhorhea* Hübner, Zutr. Exot. Schm. i, 12, figs. 43–44, 1818 (date of publication of name, according to Hemming.)

Also *figured:* Hamps. f. 183; Seitz 19: h1.

The Erste Zuträge name is undoubtedly valid, but has had no usage whatever, and had better be forgotten. It was doubtless changed as being preoccupied by *chrysorrhea* Linn., in the same Linnæan subgenus.

Transparent, slightly bluish; with broad black borders and band across fore wing, and red tail.

Jan. 1, 1929 (Curran, Am. Mus. Nat. Hist.). Costa Rica to Guiana and Amazons.

*Cacostatia sapphira* is startlingly similar, but has two dorsal veins stalked in hind wing.

### SYNTRICHURA Butler

Similar to *Chrysostola*; abdomen moderately constricted on second and third segments, marked with narrow dorsal and wide lateral white patches so as to appear much more slender than it is. Both wings with  $M_2$  and  $M_3$  completely united.

#### 812.1 SYNTRICHURA REBA Druce

*S. reba*, Dr. Ann. Mag. Nat. Hist. (6) xviii, 33, 1896.

*Figured:* Biol. 72: 7.

Black and blue with transparent wings, sides of thorax red; fore wing with narrow border and discal bar, hind wing with apex black.

Feb. 6 (Gertsch, A.M.N.H.). Chiriqui and Colombia.

### CHRYSOSTOLA Herrich-Schäffer

Abdomen hardly constricted in the present species, more strikingly so in *C. zethus* (Hamps. fig. 184).

The name *Abrochia* H.-S. has "page priority," but is not in general use; it was revived in the Lep. Cat. and Seitz.

1. Body yellow, with narrow black markings, the terminal half more orange. Fore wings with orange streaks below costa and toward inner margin; veins of hind wing black. . . . . *fulvisphex*  
Body yellow, the head, prothorax and tail black and blue; veins of antemedial portion of fore wing and most of hind wing light yellow, contrasting with the black remaining portions . . . . . 2
2. Smaller; anterior part of thorax, tegulae and hoods yellow. . . *augusta*  
Larger; whole thorax and hoods black. . . . . *mellita*

#### 826a CHRYSOSTOLA MELLITA Schaus

*C. mellita* Schs. Ann. Mag. Nat. Hist. (8) vii, 180, 1911.

*Figured:* Hamps. Suppl. 12: 22; Seitz. 19: i1.

The yellow veins go practically to the base of the wing; in the female the discal spot is large and round.

Jan. 3 (Bts.), Feb. 9 (A.M.N.H.), Apr. 3 (Fried.), July 24 (Fairchild), 31 (Banks). Costa Rica.

#### 827 CHRYSOSTOLA AUGUSTA Druce

*Dycladia augusta*, Dr. Biol. Centr. Am. Het. i, 62, 7: 19, 1884.

Also figured: Seitz 26: k2 (much enlarged). (Not 19: h).

The apical black border is very narrow.

Nov. 29 (Bts.), Feb. 8 (A.M.N.H.), July 25 (Banks). Guatemala (type).

#### 837 CHRYSOSTOLA FULVISPEX Druce

*C. fulvispex*, Dr. Ann. Mag. Nat. Hist. (7) i, 404, 1898.

Figured: Hamps. 13: 13; Seitz 19: k4.

Mar. 23 (Friedman). Guiana and Amazons.

#### ECDEMUS Herrich-Schäffer

Apparently close to the North American Cisseps, but with closer held palpi and smoother front. The present species would go by venation in *Teucer*, but differs in the loss of the rudimentary Sc and narrow costal area of hind wing. "*Teucer*" *carmania* Dr. is close.

#### 841b ECDEMUS OBSCURATA Schaus

*E. obscurata* Schs. Ann. Mag. Nat. Hist. (8) vii, 180, 1911.

Figured: Hamps. Suppl. 12: 27; Seitz 28: n2 ♂.

Male with disc of both wings transparent, female with only hind wing.

Dates scattered (see diagram, p. 101). Costa Rica (type).

#### PTERYGOPTERUS Butler

Apparently an offshoot of the *Ceramidia* group; the valve is small, but edged with white.

#### 852 PTERYGOPTERUS LEUCOMELA Walker

*Automolis leucomela* Wlk. List Lep. Ins. Br. Mus. vii, 1636, 1856.

Figured: Biol. 8: 7; Seitz 20: a4.

Body marked with blue, with pale lateral spots on third segment; apical fifth of fore wings white.

Oct. 26, Nov. 26 (Bts.), Jan. 3 (Curran, Am. Mus. Nat. Hist.). Ranges to Para.

### EPISCEPSIS Butler

A derivative of *Eucereon*, as shown by the preservation of Sc, but with much reduced markings. The males of most of the species have hair pencils at the inner margin of the hind wing, above, below or both, but they are concealed in deep folds and often hard to bring out. The following key is the best I can make using only bisexual characters, but may fail occasionally.

The larva of *E. phlebitis* is in the National Museum. It is pale yellow, with a group of black dorsal spots in each segment except metathorax where there is a red spot. Hair fine and soft, with only a weak lateral pencil on first segment of abdomen.

1. Fore coxæ pink. . . . . 2  
Fore coxæ white. . . . . 7
2. Ground gray, with contrasting dark border and veins. . . . . *renata*  
Ground dark without dark border or strongly contrasting veins. 3
3. Red prothoracic spot on outer edge of patagium (tergite); male with slight angle and pencil at inner edge of hind wing above; fore wing concolorous dark. . . . . *lamia*  
Red prothoracic spot on pleura only. . . . . 4
4. Fore wing with a white apical patch; anal lobe of hind wing strong with a massive yellow pencil above; fore wing with veins rather paler, the white on under side of body and hind wing often rather weak. . . . . *lenæus*  
Fore wing without apical white patch. . . . . 5
5. Lobe at anal angle strong; pencil strong, veins of fore wing somewhat paler. . . . . *lenæus*, var.  
Lobe at anal angle weak; veins of fore wing concolorous or somewhat darker. . . . . 6
6. Larger; male with white pencil below; under side of hind wing in both sexes and of abdomen in female blackish. . . . . *hypoleuca*  
Smaller; hind wing with a groove but no pencil below; under side of hind wing with a large white patch in male, reaching inner margin, of abdomen white in both sexes. . . . . *frances*
7. Vertex with a pair of red spots; prothorax with one, rarely two red spots on side; male with slight anal lobe and pencil below; fore wing with dark veins, and no white apex. . . . . *gnomoides*

Vertex with markings yellow and normally more extensive, the halves of collar more or less outlined with yellow; veins of fore wing pale; the apical third with a white patch; hind wing without lobe and pencil; under side blackish in both sexes. . . *capysca*

GROUP I: *Male with anal lobe large, and hair-pencil massive, on a special support.*

856 EPISCEPSIS LENÆUS Cramer

*Sphinx lenæus* Cr. Pap. Exot. iii, 95, 248: G, 1780.

Also figured: Seitz 20: b1.

*Larva*: Stoll in Cr. Pap. Exot. v, 15: 4-6, 1790 (as *leneus*).

Generally distinguished by the pink coxæ and white apex. In one specimen the white apex is almost completely obscured, but it is a male, and recognizable by the massive white hair pencil.

Oct. 30-Mar. 15. Mexico to Guiana. Cuba.

Larva according to Stoll on cotton, Halysidota-like, with long subdorsal and shorter lateral tufts on 1st and 8th segment of abdomen, short dorsal tufts on middle segments and a few clubbed hairs. Varicolored, the thorax dominantly yellow, the rest more red-brown and black.

GROUP II. *Hind wing of male slightly lobed, with pale hair-pencils above, below or both.*

862 EPISCEPSIS HYPOLEUCA Hampson

*E. hypoleuca* Hamps. Cat. Lep. Phal. i, 388, 14: 4; 1898.

Also figured: Seitz 20: d4.

A massive pencil beneath.

Dec.-Mar., July-Aug.; Lancetilla, Honduras (Bates) commoner than in Panama, Mar.-May. Described from Venezuela.

862a EPISCEPSIS FRANCES Dyar

*E. frances* Dy. Proc. U. S. Nat. Mus. xxxviii, 230, 1910.

Figured: Hamps. Suppl. 13: 3.

The species has a specially scaled groove on under side but I can find no pencil in it.

Oct. to Apr.; Lancetilla, Honduras (Bts.). Mexico to Guiana and Peru.

## 860 EPISCEPSIS LAMIA Butler

*Heliura lamia* Btl. Ill. Lep. Het. Br. Mus. i, 44, 16: 3, 1877.

Also figured: Seitz 20: c1.

The lateral spot on prothorax is lower than usual, leaving a distinct space between it and the collar spot. *E. dodaba* Dyar, placed by Hampson as a synonym of *inornata*, seems rather to be a form of this with reduced collar-spots. Pencil above.

Nov. 24 (Bts.), Mar. 30 (Fried.) Described from Amazons.

## 859a EPISCEPSIS GNOMOIDES Schaus

*E. gnomoides* Schs. Ann. Mag. Nat. Hist. (8) vi, 190, 1910.

Figured: Hamps. Suppl. 13: 1; Seitz 28: 11.

The anal lobe is very weak and I can find a hair pencil only below.

Mar. 15 (A.M.N.H.); July-Aug. (Fairchild, U. S. Nat. Mus.), (Schaus det.). Described from Costa Rica.

## 863 EPISCEPSIS VENATA Butler

*E. venata* Btl. Ill. Lep. Het. B.M. I, 49, 16: 7, 1877.

Also figured: Seitz 20: d5.

Light luteous, with contrasting black border, veins and discal bar. The present specimen is paler and more contrasted than Seitz's figure.

Mar. 17 (A.M.N.H.) 1 ♀. Mexico to Amazons.

GROUP III. *Hind wing not at all lobed at anal angle, without a hair-pencil.*

## 857a EPISCEPSIS CAPYSCA Schaus

*E. capysca* Schs. Ann. Mag. Nat. Hist. (8) vi, 190, 1910.

Figured: Hamps. Suppl. 12: 31; Seitz 28: 12.

The pale streaks are stronger and the yellow on the head more extensive than in the other species known to me. *E. capyscoides* Schs. from Guiana is very close but has less yellow. Hampson, lacking males, placed both by mistake in the group with lobe and pencil.

Nov. 2, 30, Dec. 23, Mar. 5, 17, July-Aug. Costa Rica (types).



## ANDROCHARTA Felder

The peculiar pattern of fore wing and much reduced hind wing give this genus a distinctive appearance. In nature the male hind wing is entirely concealed by the fore wing except the minute anal area, and the whole moth looks Dipterous.

## 869 ANDROCHARTA MEONES Stoll

*Sphinx meones* Stoll in Cr. Pap. Exot. iv, 73, 325: E, 1780.

Also *figured*: Sepp. Surin. Vlinders i, 81, 37, 1848 (as *Glaucoptis compta*);

Herrich-Schäffer, Aussereur. Schm. fig. 237 (as *Charidea meonioides*);

Hamps. fig. 198; Seitz 20: c1 ♂, 2 ♀.

*Larva* and *pupa*: Sepp, l.c.

Shoulder white, red streak on costa and middorsal spots on abdomen. Male hind wing very short and small, white above except the minute anal lobe.

Larva pale yellowish, with massive lateral tufts on 1st and 8th segments of abdomen and scattered longer hairs or small pencils on the same segments; pupa light brown, shining. Food Paullinia and Inga.

July-Aug. (Fairchild). Ranges to Guiana.

*Ceramidia butleri* Möschler is in the American Museum from Balboa, Nov. 14, 1914 (Seitz 20: g3). It is black and green, with a red streak deep in groove of neck. Larva apparently on banana.

AMYCLES "Herrich-Schäffer"<sup>1</sup>

Male with R<sub>5</sub> arising from stem of R about 2/3 way from end of cell to apex. Hardly distinct from *Ceramidia* Btl.

## 884 AMYCLES ANTHRACINA Walker

*Euchromia (Anycles) anthracina* Walker, List Lep. Ins. Br. Mus. i, 253, 1854.

*Figured*: H.-S. Aussereur. Schm. 259; Butler Ill. Lep. Het. Br. Mus. i, 9: 7;

Hamps. fig. 201; Seitz 20: i4.

<sup>1</sup> The name *Amycles* is in a fantastic tangle. In 1854 Walker proposes it as new ("MSS."), as a subgenus with the spelling "*Anycles*". Later he refers back to it as "*Amycles*" without comment (vii, 1633). Herrich-Schäffer first proposes *A. anthracina*, apparently as new, in 1855 (date according to Horn and Schenkling for the plate). His earliest text reference to this is under the generic name *Eriphia* "HV" (but *Eriphia* of Hübner's Verzeichniss is a Fabrician species, the genus name being *Antichloris*). Later he writes "*Amycles* Bd., *Eriphia* HV", but I cannot find any use of the name by Boisduval. Nomenclatorially it would appear we must write "*Anycles* Walker", but *Amycles* is in current use, following Hampson.

Deep brown with some crimson scales in neck; apices of fore wings whitish; first segment of abdomen white-edged below, with a small valve in male.

Balboa, July-Sept. (Hallinan, Am. Mus. Nat. Hist.) Mexico to Brazil.

#### LEUCOPLEURA Hampson

Distinguished from *Amycles* and *Ceramidia* by the stalking of  $R_2$  with  $R_1$  instead of  $R_3$ ,  $M_2$  of hind wing from lower angle of cell, and transparent markings. The pattern is a common one in the Upper Amazon Basin, black, blue and transparent, and is found in members of all the main groups of the family. The other species has the transparent areas more extensive and less blue on the hind wing.

#### LEUCOPLEURA CIARANA Schaus

*L. ciarana* Schs. Proc. U. S. Nat. Mus. lxxv (7) 12, 1924.

Black shot with blue, two single transparent spots on fore wing and a double one representing the m. fascia, hind wing blue with a transparent streak below cell and double outer spot.

Tabernilla, Panama, type only.

#### ATYPHOPSIS Butler

Similar to *Napata*; wings broad and translucent,  $M_2$  and  $M_3$  stalked in both wings.

#### 893 ATYPHOPSIS MODESTA Butler

*A. modesta* Btl. Trans. Ent. Soc. Lond. 1878, 49.

*Figured:* Hamps. fig. 208; Seitz 21: b3.

Gray, head black and orange-red; thorax gray and orange; middle of abdomen orange; wings dark-veined.

Feb. 17, Mar. 9 (A.M.N.H.). Costa Rica, Guiana, Amazons, etc.

#### NAPATA Walker

An extremely varied genus, probably related to *Ctenucha*, and without any very striking specializations.

1. Yellow, marginal area streaked with black and white. . . . *walkeri*  
Blue-black, body with blue dorsal stripe, wings with white spots. 2

2. Larger; fore wing with white postmedial spot, hind wing with transparent disc.....*flaviceps*  
 Smaller, fore wing with base and disc transparent, hind wing opaque.....*leucotelus*

### 899 NAPATA WALKERI Druce

*Erius walkeri* Dr. Ann. Mag. Nat. Hist. (6) iv, 86, 1889.

*Figured:* Biol. 73: 21; Seitz 21: c3.

Obviously mimetic; the pattern recurs in the Pyralid, *Mapeta xanthomelalis*.

Dec. 4 to Mar. 26. Also Costa Rica, Chiriqui and Taboga Id. (type).

### 912 NAPATA LEUCOTELUS Butler

*N. leucotelus* Btl. Jour. Linn. Soc. Zool. xii, 409, 1876.

*Figured:* Biol. 7: 24; Seitz 21: f2.

Head and front of thorax solidly green-blue; extreme tip of fore wing and inner fringe of hind wing white.

Jan. 17 (Bates). Lancetilla, Honduras, Aug. (Bts.). Mexico to Venezuela.

### 917b NAPATA FLAVICEPS Hampson

*N. flaviceps* Hmps. Ann. Mag. Nat. Hist. (7) viii, 173, 1901.

*Figured:* Hamps. Suppl. 14: 25; Seitz 29: e6.

Vertex and sides of prothorax yellow, upper face white; hind wing much bluer than fore wing.

Nov. 14; Feb. 1 (Bts.), Mar. 17, June 16 (Fried.). Described from the Canal Zone (La Chorrera). Costa Rica and Colombia (U. S. N. M.)

### ACLYTIA Hübner

Fore wing with  $R_2$  free, hind wing with a rudiment of Sc and costa broad at middle;  $M_3$  and  $Cu_1$  stalked; fore tibia of male with a hair-pencil. Simply marked, usually with a yellow or white spot or transverse bar on fore wing and transparent disc on hind wing.

1. Band of fore wing white; markings of under side of body white, but back of head, palpi and collar with yellow . . . . .*albistriga*  
 Band or spot on fore wing yellow; stripe on under side concolorous with head markings. . . . . 2

- Band on fore wing absent; abdomen with yellow bar below; collar and shoulders with paired orange-red dots. . . . . *ventralis*
2. Markings on under side of thorax and stripe on abdomen pure white; palpus marked with white, the head with traces of white scaling. . . . . *punctata*
- Stripe on under side yellow, continuous from thorax, where it is formed mainly of the coxæ; head with yellow markings on vertex, palpi and collar. . . . . 3
3. Both sexes with yellow fascia across fore wing. . . . . *gynamorpha*
- Male with a round middle costal spot. . . . . *heber*

1007a *ACLYTIA ALBISTRIGA* Schaus

*A. albistriga* Schs. Ann. Mag. Nat. Hist. (8) vi, 191, 1910.

*Figured:* Hamps. Suppl. 15: 29; Seitz 29: k1.

The black is intense and the blue body very bright in this species. Feb. 4 (Bts.) ♂; Costa Rica, unique ♀ type.

1009 *ACLYTIA PUNCTATA* Butler

*A. punctata* Btl. Jour. Linn. Soc. Zool. xii, 414, 1876.

*Figured:* Hamps. 15: 12; Seitz 23: e3 (♂ var. *astigma* Strand).

Male typically with a small yellow spot near middle of costa, rarely absent (var. *astigma* Strd.) or extended to inner margin (var. *megastigma* Strd.). Female with the complete fascia, but variable in width.

Apr. 22 (var. *megastigma*) and 26 (Fried.) Lancetilla, Honduras (Bts.). Ranges south to the Amazons.

1011 *ACLYTIA GYNAMORPHA* Hampson

*A. gynamorpha* Hmps. Cat. Lep. Phal. i, 457, 1898.

*Figured:* Butler Ill. Lep. Het. Br. Mus. i, 8: 3 (as *flavigutta*); Seitz 23: e6 ♂.

Both sexes with a broad yellow fascia on fore wing.

Dec.-Mar. Lancetilla, Honduras (Bts.) Amazons (type) Surinam (Cornell).

1012 *ACLYTIA HEBER* Cramer

♂ *Sphinx heber* Cr. Pap. Exot. iii, 169, 287: A, 1780.

♀ *Sphinx halyx* Stoll in Cr. Pap. Exot. iv, 129, 357: C, 1787.

Also *figured:* Hamps. fig. 245; Seitz 23: f1 ♂, 2 ♀, 3 (ab. *insignata* Ddt.).

Female not certainly distinguishable from *A. gynamorpha*, but normally with much broader yellow band.

July-Aug. (Fairchild). Also reported by Dyar from the Zone, but both records based on females and so not quite certain. Mexico to southern Brazil.

### 1013 *ACLYTIA VENTRALIS* Guérin

*Glaucopis ventralis* Guér., Icones Règne Anim. Ins. 503, 1844.

*A. conspicua* Dr. Biol. i, 70: 8: 23, 1884.

Also figured: Seitz 23: f4.

July-Aug. (Fairchild). Ranges to Mexico.

*Mydromera notochloris* Bdv. (Seitz 23: i5, as *isthmia* Fld.) was taken in the Canal Zone by Hallinan (A.M.N.H.). It is black and blue with a narrow translucent stripe on each wing.

### DELPHYRE Walker (*Necocerea* Hampson, with *Mesocerea* Hampson and *Ptychotrichos* Schaus)

This genus is close to *Eucereon*, differing definitely only in the complete fusion of  $M_3$  and  $Cu_1$  of the hind wing, and even this character is variable in *D. atava*. *Mesocerea* is supposed to differ in the wider separation of  $M_2$  from  $M_3-Cu_1$  in the hind wing, but the character varies individually and the appearance is homogeneous. The radial venation also varies occasionally,  $R_1$  being stalked, or  $R_2$  free.  $M_2$  and  $M_3$  of fore wing may be connate or more or less stalked.

1. Plain brown without markings; fore wing with  $M_3$  and  $Cu_1$  stalked, anal angle of hind wing of male with pointed lobe and pencil. . . . . 2  
Fore wing and thorax with definite patterns;  $M_3$  and  $Cu_1$  separate; hind wing without lobe and pencil. . . . . 3
2. Expanse 24 mm.; female light wood brown. . . . . *hebes*  
Expanse 16 mm.; female fuscous like male. . . . . *clachia*
3. Abdomen and hind wing mostly yellowish, fore wing gray with brown spotting. . . . . *cumulosa*  
Abdomen mostly scarlet; fore wing with quadrate blackish spots nearly in contact, leaving the veins and transverse lines pale, and also a broader pale patch below cell and postmedial line. . . . . *aurorina*  
Abdomen mostly blackish. . . . . 4

4. Under side of abdomen with a yellow patch on four middle segments, also head and fore coxae yellow; fore wing fuscous with darker veins, and paler shade below cell, and transverse post-medial fascia. . . . . *flaviceps*  
 Under side of abdomen dark, above blue, underside of thorax scarlet; fore wing evenly blackish above. . . . . *atara*  
 Under side of body somewhat diffusely whitish, above with scarlet lines on incisures, often almost completely hidden, fore wing with large quadrate spots, but antemedial region below cell with fine curved dark lines. . . . . *rubricincta*

#### 1057 DELPHYRE RUBRICINCTA Hampson

*Neacerea rubricincta* Hmps. Cat. Lep. Phal. i, 479, 16: 5, 1898.

Also figured: Seitz 24: c5.

Fore wing with  $R_1$  free,  $R_2$  stalked nearly to origin of  $R_5$ ,  $M_2$  and  $M_3$  shortly stalked; hind wing with  $M_2$  barely separated. Hind wing black with a group of translucent white discal patches between veins.

The nearest species to this seem to be *rhodocrypta* and *phæosoma*, but both have a pair of thick antemedial patches below cell, instead of the 3-5 lines, *phæosoma* is also much more brightly colored, with some red.

Main flight in Oct. to Feb. (see diagram, p. 101). Described from Taboga Id. Venezuela (Nat. Mus.).

#### DELPHYRE AURORINA new species

Fore wing with  $R_1$  stalked,  $M_2$  and  $M_3$  strongly stalked (*Ptychotrichos* of Hampson); hind wing with  $M_2$  well separated.

Head, thorax and first segment of abdomen blackish; head yellow behind, shading into scarlet toward neck; sides of collar lobes finely edged with orange; posterior edge of scutellum yellow, but metathorax blackish. Abdomen scarlet, with black lateral stripes and terminal segment; beneath paler, shading into whitish in front, and with two black terminal segments. Fore coxae pink, femora and underside of thorax diffusely whitish. Fore wing almost covered with quadrate blackish spots, separated in most parts only by the fine pale veins and lines. A yellow basal spot; then five blackish bars between veins, the two in fold shorter and leaving a whitish antemedial patch, which is continuous with a squarish spot in cell and bar to inner margin. Medial fourth blackish, cut by the pale veins and a pale bar from  $Cu_2$

to inner margin, and followed by a white fascia from  $R_5$  to  $Cu_1$ , whose second spot is largest and 3rd and 4th offset a little outward, the last continued by a light gray line to  $Cu_2$ . Outer part similar, the upper portion bisected by a pale gray st. line down to  $M_2$ ; extreme apex white, anal fringe cut with white. Hind wing translucent white, with black border almost half width of wing and broadly continued to base on inner margin. Under side of fore wing black, except for white spots in and below cell, and four pm. ones corresponding to those of upper side. Hind wing as above. 25 mm.

This may possibly be the unknown female of *D. macella* Dgn. (Hamps. Suppl. fig. 44, Seitz 24: e4) but the sexual dimorphism would be unusual, especially the contrast of pink coxæ and scarlet vertical spot, and the larger antemedial white patch.

Barro Colorado Id., Panama, Nov. 30, 1934 (Bates), Holotype, Jan. 24, Feb. 2 (Friedman), paratypes, all females.

#### 1064 DELPHYRE ATAVA Druce

*Heliura atava* Druce, Biol. Centr. Am. Het. i, 74, 1884.

*Ptychotrichos episcepsidis* Dyar, Proc. U. S. Nat. Mus. xlvii, 163, 1914.

*Figured:* Hamps. 16: 24; Seitz 24: f1.

Venation highly variable,  $R_1$  free or stalked;  $M_3$  and  $Cu_1$  of hind wing united (male) or stalked (usually in female). Blackish; abdomen mostly blue; two dorsal crimson spots on head and all coxæ crimson, but no stripe on abdomen. Male hind femur swollen, with a white pencil.

Feb. 27 (Friedman) 1 ♀. The types of both names were from the Canal Zone.

#### 1064b DELPHYRE FLAVICEPS Druce

? *Heliura testacca* Druce, Biol. Centr. Am. Het. i, 74, 1884 (♀).

*Figured:* Hamps. 16: 6; Seitz 24: f3.

*Neacerea flaviceps* Druce, Ann. Mag. Nat. Hist. (7) xv, 463, 1905 (♂).

*Figured:* Hamps. Suppl. 17: 13; Seitz 30: b4.

Male (*flaviceps*) a little paler than supposed female (*testacca*) and the black veins therefore more contrasting.

May 7 (Friedman). Described from Venezuela (*flaviceps*) and Guatemala (*testacca*).

Dyar describes *Delphyre elachia* and *cumulosa* from the Canal Zone (Proc. U. S. Nat. Mus. xlvii, 163) and also reports *D. hebes* Walker (Hamps. Suppl. 16: 21).



## HELIURA Butler

Hardly distinct from *Eucereon*, the separation of  $M_2$  and  $M_3-Cu_1$  varying individually. But the present species are apt to be more spotty looking.

1. Abdomen pink . . . . . *balia*  
    Abdomen dark . . . . . 2
2. Abdomen brown, with apical half yellow . . . . . *maculosa*  
    Abdomen black, with minute white tip . . . . . *banoca*  
    Abdomen bright blue, without pale tip . . . . . *Delphyre atava*

## 1086, 1069b HELIURA BALIA Hampson

*Eucereon balium* Hmps. Cat. Lep. Phal. i, 494, 1898; *Heliura b.* Hmps. Suppl. i, 308, 1914.

*Figured:* Hamps. 16: 13; Seitz 24: g2.

Fore wing with  $R_2$  long-stalked, in one specimen beyond origin of  $R_5$ ,  $M_2$  and  $M_3$  stalked, hind wing with  $M_2$  arising pretty close to  $M_3 + Cu_1$ .

Hind wing without sexual modification; spotting of fore wing gray; abdomen pink to base, continuous with the yellow scutella. Under side of thorax with a little pink on coxæ only.

Nov. 25, Dec. 7, Feb. 1, May 6. Guatemala to Colombia (Nat. Mus.).

## 1059 HELIURA MACULOSA Hampson

*Neacercia maculosa* Hmps. Cat. Lep. Phal. i, 479, fig. 265, 1898.

Also *figured:* Seitz 24: c7.

Fore wing with dark spots well contrasted and brown, especially the basal ones, which are rounded; abdomen with brown base tapering to a point on 4th segment and followed by dots on 5 and 6, and a larger spot on 7 and 8. Under side with a yellow stripe.

Hampson treats this as a *Neacercia (Delphyre)* and figures it with a vein missing; in all the specimens at hand  $M_2$  is well separated and  $M_3$  and  $Cu_1$  are stalked.

Dec., Jan., Mar. June, July-Aug. Described from Para.

Dyar describes *Heliura banoca* from the Zone. Fore wing with black spotting almost confluent, leaving translucent white areas; abdomen black above, white below in male.

## EUCEREON Hübner

Palpi upturned to vertex, closely held; abdomen shaggy above toward base; fore wing with  $R_2$  stalked,  $M_2$  and  $M_3$  frequently stalked; hind wing normally with a stub of Sc, R and  $M_1$  connate or slightly stalked;  $M_3$  and  $Cu_1$  normally short-stalked,  $M_2$  from their base, or very close.

The complex pattern of this genus frequently shows the normal moth elements (ante- and postmedial lines, orbicular and reniform spots, etc.) It is perhaps the most primitive of the family (unless the patterned species of Hyaleucerea). *Heliura*, *Delphyre*, *Episcepsis* and *Aclytia* may be derived directly from this genus or Hyaleucerea; in fact some specimens of *D. atava* show the structure of Eucereon (while the pattern would be more normal for *Episcepsis*). The species are numerous, and doubtless more will be taken on the Island, — four of the present list were taken after the preparation of this report was well under way.

The larva of *E. carolina* H. Edw. is black with flesh colored warts, and black, gray and white hairs, the longer hairs at the ends white-tipped. The young caterpillar is pale. It was reared on *Philibertia* and *Vincetoxicum* (Apocynaceæ).

1. Abdomen metallic blue above. . . . . 2  
    Abdomen not metallic. . . . . 3
2. Fore wing with a complex pattern in white scales . . . . . *obscurum*  
    Fore wing immaculate. . . . . *Delphyre atava*
3. Abdomen gray, with at most the terminal segment yellow. . . . . 4  
    Abdomen with at least the sides of the 4th to 7th segments yellow  
       or pink, or subterminal segments shaded laterally with cream. . 7
4. Fore wing with broad gray vein-streaks, but without normal trans-  
    verse lines; the white or cream postmedial spot beyond the cell  
    not crossed by dark lines. . . . . 5  
    Fore wing with lines finer and black, crossing the postmedial area  
    at least part way; ante- and postmedial lines normal in character,  
    at least partly gray. . . . . 6  
    Fore wing fuscous, with confused markings and black discal dot.  
    . . . . . *pometinum*
5. Smaller; white postmedial patch broadly oval, not constricted;  
    head above with two well separated deep yellow spots. *intranotata*  
    Larger; postmedial patch narrow, lunate; head dorsally solid  
    yellow. . . . . *phæoproctum*

6. Large; front crossed by a white bar below antennæ; fore coxæ and middle and hind tibiæ white at upper ends. . . . . *flaricaput*  
 Small; front normally even light gray; fore coxæ wholly white; mid tibiæ wholly gray, the hind ones with more white on distal portions. . . . . *scyton*
7. Abdomen with pink or yellow extending to base; at most with some of the dorsal loose hair whitish. . . . . 8  
 Abdomen pink but with the whole first segment gray, contrasting. . . . . *rosa*  
 Abdomen with several segments dark basally, at least on the dorsum; subterminally red, yellow, or at least suffused with cream subdorsally. . . . . 12
8. Color of abdomen pink. . . . . 9  
 Color of abdomen yellow; last segment black, contrasting; fore wing with discrete blackish spotting. . . . . *aoris*
9. Ground and pattern of confused shades of gray; antemedial and postmedial lines scalloped, white, defined with blackish. . . *maia*  
 Ground pale, with discrete contrasting dark spotting, at least on basal portion of wing. . . . . 10
10. Fore wing with about 30 jet black spots, the ones about end of cell well separated. . . . . *atrigutta*  
 Spots of fore wing mainly gray, those about end of cell separated by the pale veins only. . . . . 11
11. Whole disc of hind wing translucent white, the borders only blackish; area of fore wing below the cell cream white, not or slightly darkened between the spots, which are slightly diffuse;  $M_3$  and  $Cu_1$  of hind wing strongly stalked. . . . . *Heliura balia*  
 Hind wing wholly or practically all, light gray; submedian area of fore wing shaded with light gray between the spots, making them appear slightly ocellate;  $M_3$  and  $Cu_1$  connate or barely stalked. . . . . *zamora*
12. Veins and antemedial, postmedial and at least half of medial lines dark, contrasting on a pale ground. . . . . 13  
 Veins and ordinary lines so far as traceable pale on a blackish ground, a large part of which they cut into quadrate spots. . . 15
13. Abdomen red, the middle without a continuous stripe; fore wing with ground luteous. . . . . *dentatum*  
 Abdomen gray and light yellow, the middorsum continuously gray; ground of fore wing practically white. . . . . 14

14. Outer margin concave; pattern with considerable shading of two shades of dark gray, with bars below  $M_1$  and  $Cu_1$  subterminally.....*striatum*  
Outer margin normal; fore wing lightly marked with gray on a white ground, none of the spots elongate.....*zephyrum*
15. Ground luteous, the spots relatively small, in the basal and marginal areas smaller than the spaces between them; dorsum with black middorsal dots on four penultimate segments.....*æolum*  
Ground darker, at least in the marginal area with the pale markings less extensive than the spots they define; three penultimate segments of abdomen without middorsal black spots.....16
16. Antemedial band formed of four or five sharp zigzags, separated by the pale veins, and preceded above A by an open blackish loop, the ground rather dark brown; submarginal spots similar, preceded by chevron-shaped black spots.....*pseudarchias*  
Antemedial band less regular, or pale, preceded by a solid black patch between fold and anal vein.....17
17. Subterminal spots all alike, black bars surrounded by pale loops, and preceded by chevrons which are reduced in cells  $M_2$  and  $M_3$ ; ground wood brown; antemedial area dominantly light, with confused fragments of a blackish antemedial line. ....*latifascia*  
Subterminal spots in cells  $M_3$  and  $Cu_1$  reduced, in a pale patch, the rest preceded by simple pale lines, not chevron-like; all lines narrow, simple and pale, cutting the ground into oblong patches.  
*hyalinum*

## 1075 EUCEREON OBSCURUM Möschler

*Aclytia obscura* Msch. Stett. Ent. Zeit. xxxiii, 348, 1872.

*Epanycles stellifera* Butler, Ill. Lep. Het. Br. Mus. i, 16: 10; 1877.

Also figured: Seitz 24: g3.

The blue body and pure white scaling on a coal black ground make an unique combination.

Flight scattering, late Oct.-Jan. (see diagram, p. 101). Lancetilla, Honduras. Mar.-May (Bts.). Mexico to Amazons.

## 1079 EUCEREON ROSA Walker

*Euchromia (Eucereon) rosa* Wlk. List Lep. Ins. Br. Mus. i, 271, 1854.

Figured: Hamps. 16: 17; Seitz 24: h5.

This is the species as determined in the U. S. National Museum — the one with a white postmedial patch ending abruptly at  $M_2$ . In

*E. rosadora* Dyar the pale postmedian band is narrow, and even in width to Cu<sub>2</sub>. Hampson's figure looks like *rosadora*; Seitz's is unrecognizable.

Oct., Dec., Jan., Apr., July-Aug. Honduras (type). Brazil.

#### 1121e EUCEREON ZEPHYRUM Schaus

*E. zephyrum* Schs. Ann. Mag. Nat. Hist. (8) vi, 194, 1910.

Figured: Hamps. Suppl. 19: 25; Seitz 25: h6 (z. *songoense*).

Distinguished by its paleness; dominant white ground, light markings, light gray body marked with yellowish white.

Feb. 17, 18, Mar. 3 (A.M.N.H.). Costa Rica (type) and Bolivia (z. *songoense* Ddt.).

#### 1110 EUCEREON STRIATUM Druce

*Theages striata* Dr. Ann. Mag. Nat. Hist. (6) iv, 86, 1889.

Figured: Biol. 73: 9; Seitz 25: e2.

Easily recognized by its concave outer margin and remarkable resemblance to a caddis fly. Abdomen divided by a fine black dorsal line.

Mar. 9 (A.M.N.H.). Ranges north to Mexico and south to Brazil (*s. pallescens* Roth).

#### 1085b (1085) EUCEREON ZAMORAE Dognin

*E. zamoræ* Dgn. Ann. Soc. Ent. Belge xxxviii, 681, 1894.

Figured: Hamps. Suppl. 18: 10; Seitz 30: g2 (unrecognizable).

The spots about the end of cell and from there to anal angle are exaggerated — also the subterminal spots above M<sub>2</sub> — making distinct dark patches. In one of the two specimens the basal spots are reduced in size, the orbicular is small and distant from the other spots, and the basal spots in fold and at inner margin are black, giving the appearance of *E. argutum* as determined in the National Museum. The latter in its original description is compared with *hogei*, a paler species with more complex markings.

*Heliura balia* is dot for dot the same, most definitely distinguished by the longer stalking of M<sub>3</sub> and Cu<sub>1</sub>.

May 1 (normal) Feb. 27 (trans. to *argutum*) (Fried.). So. Mexico to Ecuador.

## 1088a EUCEREON ATRIGUTTA Druce

*E. atrigutta* Dr. Ann. Mag. Nat. Hist. (7) xv, 464, 1905.

*Figured:* Hamps. Suppl. 18: 14; Seitz 24: 14.

In this species only the spots at base of inner margin and the basal one in cell  $Cu_2$  are a little enlarged; in *E. quadricolor*, also reported from Panama, many spots are large and some partly fused.

Mar. 7, 22 (Fried.) Apr. 2 (Bradley, Cornell). Mexico to Venezuela; Sta. Catherina, Brazil.

## 1091a EUCEREON HYALINUM Kaye

*E. hyalinum* Kaye, Trans. Ent. Soc. London 1901, 119, 5: 11.

Also *figured:* Seitz 24: k4.

Besides the spot on the outer margin there is a conspicuous squarish yellow spot in the cell, and the scutellum is yellow. Abdomen above with red confined to subdorsal spots on 4, 5, 6, and anterior 2/3 of 7; beneath with a pink stripe on thorax, including whole of fore coxæ.

Dec. 24 (Bates) June 30 (Fried.) Venezuela and Trinidad.

## 1097 EUCEREON MAIA Druce

*E. maia* Dr. Biol. Centr.-Am. Lep. Het. i, 86, 9: 13, 1884.

Also *figured:* Seitz 25: b3.

The most Noctuid-like in pattern of the Euchromiidae at hand, the ordinary lines being regularly scalloped and white filled, and ordinary spots dark with slightly paler centers. The basal hair is partly white.

Mar. 19 (A.M.N.H.). Guatemala to Guiana.

## 1093 EUCEREON PSEUDARCHIAS Hampson

*E. pseudarchias* Hmps. Cat. Lep. Phal. i, 497, fig. 272, 1898.

Also *figured:* Seitz 25: a2 (var. *aurantiaca*).

This is the darkest species of the group and the lines are most zigzag. Abdominal segment 3 red subdorsally as well as 4; ventral stripe leaving base of fore coxæ black, but covering abdomen. In var. *aurantiaca* Draudt the abdominal markings are orange. An abnormally pale specimen might key to *acolum*, but shows the usual large dark spots about lower angle of cell and at least three subterminal ones.

Feb. 7, Mar. 3. Lancetilla, Honduras, Apr. 28 (Bts.). Mexico, to So. Brazil.

1095 *EUCEREON LATIFASCIA* Walker

*Euccrea latifascia* Wlk. List Lep. Ins. Br. Mus. vii, 1639, 1856.

*Figured:* Hamps. 16: 14; Seitz 25: a4.

Abdomen as in *pseudarchias*, but ground of fore wing much paler, with a distinct pale spot in cell, and scutellum with two yellow spots. Under side of fore wing with pale postmedial spots.

Dec. 24 (Bts.), Feb. 12, Mar. 12 (A.M.N.H.), June 20 (Fried.). Guatemala to Peru and Amazons; So. Brazil? (abnormal).

1093b *EUCEREON DENTATUM* Schaus

*E. dentata* Schs. Proc. Zool. Soc. London, 1894, 229.

*Figured:* Hamps. Suppl. 18: 26; Seitz 24: k5.

Pink on body covering penultimate segment, extending more or less onto second segment, and almost covering 3 and 4. Easily recognized by the combination of dark dentate ordinary lines and separate submarginal spots.

Nov. 28-Apr. 28. Jalapa, Mexico (type) to Ecuador.

1094 *EUCEREON ÆOLUM* Hampson

*E. æolum* Hmps. Cat. Lep. Phal. i, 498, 16: 16, 1898.

Also *figured:* Seitz 25: a3.

Spots more numerous than in the preceding 3 species; the cell with three pairs, or the two outer and lower fused into a bar; pink of abdomen extending well onto 2d segment, the under side cream, not pink. Outer edge of fore coxæ blackish; scutellum with 2 yellow spots; pink segments with dorsal black dots.

Jan. 23-May 6. Mexico to Venezuela.

1102 *EUCEREON FLAVICAPUT* Hampson

*E. flavicaput* Hmps. Cat. Lep. Phal. i, 501, 1898.

*Figured:* Biol. 9: 9 (as *leucophæa*); Seitz 25: b5.

Cream white to light olive, checkered over with blackish; ordinary lines heavy at costa; subterminal of several heavy bars and blotches running out to outer margin above  $M_3$ . Reniform phi-shaped. Head



with 2 yellow posterior spots;  $M_3$  and  $Cu_1$  of hind wing connate, as usual.

In *E. decora* the subterminal crosses cell  $M_3$  and the reniform is simple.

Dec., Feb., May, July-Aug. Lancetilla, Honduras, May (Bts.). Ranges north to Mexico.

#### 1121 EUCEREON AORIS Möschler

*E. aoris* Msch. Verh. z.-b. Ges. Wien. xxvii, 647, 8: 16, 1878.<sup>1</sup>

Also figured: Seitz 25: g4.

Pattern of fore wing much as in *Heliura balia*, differing in the normal Eucereon venation, with  $M_2$ ,  $M_3$  and  $Cu_1$  of hind wing nearly connate, more contrasting spots on fore wing and yellow, instead of pink body.

Mar. 27 (Friedman). Described from Surinam.

#### 1126 (also in Suppl.) EUCEREON SCYTON Cramer

*Sphinx scyton* Cr. Pap. Exot. ii, 5, 99: B, 1777.

*Eucereon mizar* Dr. Ann. Mag. Nat. Hist. (7) iii, 231, 1899.

Also figured: Seitz 25: i1, 31: a4.

The synonymy is after Hampson. Cramer's figure, if of this species at all, must be very bad, and Seitz's first figure is a bad copy of it. If the Cramer name is incorrect *mizar* Druce can be used.

The moth looks like a miniature of the preceding, but has  $M_2$  and  $M_3$  connate and  $Cu_1$  distinctly separate.

Jan. 28 (Bates). Ranges to southern Brazil.

#### 1127 EUCEREON PHÆOPROCTUM Hampson

*E. phæoproctum* Hmps. Cat. Lep. Phal. i, 512, 17: 16, 1898.

Also figured: Seitz 25: i2.

Larger than *E. intranotata*, the light pm. area lunate, narrow; head yellow dorsally.

Feb. 17 (A.M.N.H.). Ranges to Guatemala.

#### 1127b EUCEREON INTRANOTATA Dognin

*E. intranotata* Dognin, Ann. Soc. Ent. Belge xliv, 436, 1900.

*E. venosa* Schs. Ann. Mag. Nat. Hist. (8) vi, 195, 1910.

Figured: Hamps. Suppl. 20: 3 (as *intranotata*), 4 (as *venosa*); Seitz 31: c4 (as *intranotata*), 3 (as *venosa*).

<sup>1</sup> Printed not earlier than 1878, see footnote (1) on p. 625. The date is usually cited as 1877.

The very dark gray vein-streaks tend to fuse here and there but do not invade the oval white postmedial spot, which reaches from R-stem to  $M_3$ .

Nov. 23-Apr. 7., July-Aug. Costa Rica, Ecuador.

Dyar described a species as *Teucer atucuer* from the Zone. It is clay color with confused brown markings, and a brown spot above anal angle, and is strikingly similar to *Eucereon pomatinum* Dr. (Biol. 73: 11, Seitz 26: i6). The type shows the structures of *Ctenucha*.

### CORREBIA Herrich-Schäffer

This genus and the following are obvious mimics of Lycid beetles. The present genus has longer wings and harder scaling, but the venational differences tend to fade out or vary individually. Hampson separates the genera on the stalking of  $M_2$  and  $M_3$ , but in fact they may be stalked in Correbidia as well as Correbia. In the specimens at hand  $R_2$  is free (1 specimen) or barely stalked,  $M_2$  and  $M_3$  long-stalked, the discocellular arising from just beyond the origin of  $Cu_1$ ; hind wing with  $M_2$  usually barely stalked, sometimes slightly separate, in the M. C. Z. specimen of *C. obtusa* well stalked. In Correbidia  $M_2$  and  $M_3$  of fore wing are very shortly stalked if at all, and never on hind wing, but  $M_3$  and  $Cu_1$  are normally connate or barely stalked.

1. Femora dominantly yellow, tibiae yellow toward base; fore wing with black confined to an apical spot, fading out below  $M_2$ .

*affinis*

Femora black, with a yellow patch or bar toward base, tibiae largely or wholly black; fore wing with apical patch larger, and normally with a second median bar. . . . . 2

2. Fore wing with the transverse median fascia (or costal patch) over-scaled with lead blue like the apical one. . . . . *undulata*

Fore wing with blue confined to apical patch between veins, the median fascia solid black. . . . . *lycoides*

### 1136 CORREBIA LYCOIDES Walker

*Euchromia (Pionia) lycoides* Wlk. List Lep. Ins. B.M. i, 256, 1854.

*Figured:* Butler Ill. Lep. Het. Br. Mus. i, 8: 10; H.-S. Aussereur. Schm. fig. 265 (*ceramboides* H. S.); Seitz 25: k4.

Wings very narrow, typically with the apical black reaching in two-thirds way to the median fascia, which is also broad. The Panama specimens have the apical black extending in only to the fork of  $M_2$  and  $M_3$ , and the median fascia hardly wider than the orange stripe

beyond it, or absent. This matches the original figure of *ceramboides*, though Hampson uses this name in error for the darkest specimens.

Oct., Dec., Jan., Feb. Reported from Mexico to Brazil, but the distribution uncertain from confusion with related species.

#### 1137 CORREBIA UNDULATA Druce

*Pionia undulata* Dr. Biol. Centr. Am. Het. i, 77, 9: 3, 1884.

Also figured: Seitz 25: k5; (typical), 11 (var. *flavidorsalis*).

*C.u. nigradorsalis* and *flavidorsalis* Draudt, Seitz' Macrolep. World vi, 186, 1915.<sup>1</sup>

The wings are slightly broader than *C. lycoides*. In all the specimens at hand the abdomen is solid black dorsally (var. *nigradorsalis*); the typical form, from Guatemala, has a transverse yellow band, and in var. *flavidorsalis* about 4 middle segments are yellow, with black base and apex.

Feb. 12 (A.M.N.H.), Mar. 26 (Fried.). Lancetilla, Honduras, Mar.-May (Bts.). Ranges north to Mexico.

#### 1140 CORREBIA AFFINIS Druce

*Pionia affinis* Dr. Biol. Centr. Am. Het. i, 77, 9: 4, 1884.

Also figured: Seitz 26: b1.

The small apical spot varies in size, and presumably *C. raca* Dr. (Biol. 72: 18) is merely an extreme form which has lost it.

Flight scattering (see diagram, p. 101). Guatemala (type).

#### CORREBIDIA Hampson

A slight variant of the preceding genus. I suspect all the following are forms of one species, and that the redder orange forms from the Antilles and more yellow ones from South America are mere subspecies. The former are *bicolor* H.S. (corresponding to *striata*), *apicalis* (with incomplete bands, between *germana* and *costinotata*) and *terminalis* Wlk. (corresponding to *germana*); the latter are *calopteridia* Btl., *assimilis* Roth, and *cimicoides* H.S. *C. euryptera* Dgn., with its light variety *joinvillea* Schs., seems to be a distinct species, with subfalcate apex, and  $M_2$  and  $M_3$  of fore wing constantly stalked.

1. Fore wing orange, with fuscous streaks between veins toward apex and black streak on inner margin only. . . . . *striata*  
Fore wing with a heavy black apical patch. . . . . *elegans*

<sup>1</sup> The date of this fascicle is given on it, and in the Zoölogical Record as 1915; it was not received in Ithaca till after the War.

Fore wing with a small median costal spot also. . . . . *costinotata*

Fore wing with a complete median black band. . . . . *germana*

[1145 CORREBIDIA TERMINALIS Walker

*Pionia terminalis* Wlk. List Lep. Ins. Br. Mus. vii, 1633, 1856.

*C. terminalis* Forbes, Sci. Surv. P. R. xii, (1), 27, 1930.

*Figured:* Hamps. fig. 274.

*Larva:* Gundlach, An. Soc. Esp. Hist. Nat. xx, 156, 1891.

Larva on under side of leaves of Cecropia.

Redder than Continental races — from Greater Antilles.]

1145.1, 1146, 1147, 1145c, 1146a CORREBIDIA TERMINALIS ELEGANS  
Druce

*Pionia elegans* Dr. Biol. Centr. Am. Het. i, 78, 9: 6, 1884.

*C. terminalis* ssp. 1, Hamps. Cat. Lep. Phal. i, 519, 1898; *C. germana* Roth.  
Nov. Zool. xix, 182, 1912; *C. t. continentalis* Ddt., Seitz' Macrolep. World  
vi, 187.

*Pionia striata* Dr. Biol. Centr. Am. Het. i, 78, 9: 5, 1884.

*C. costinotata* Schs. Ann. Mag. Nat. Hist. (8) vii, 183, 1911.

Also *figured:* Hamps. Suppl. 21: 1 (*germana*), 5 (*costinotata*); Seitz: 26: b2 (*elegans*), a5 (*germana* as *continentalis*), a6 (*striata*); 31: f4 (*costinotata*).

The legs vary somewhat, but do not fall into color-groups like the species of Correbia; the tarsi are always solid black without the white of Correbia spp.

Common, banded forms commoner than plain (see diagram, p. 101). Ranges north to Mexico, and southward probably intergrades with the yellow forms, but the material is insufficient.

HYALEUCEREA Butler

Perhaps the most primitive genus of the family,  $R_2$  being free, and Sc sometimes preserved; the forms with Sc generally show parts of the Eucereon pattern, interrupted by transparent areas.

1. Fore wing solid blackish; hind wing with Sc strong, male with acute lobe and pencil. . . . . *luctuosa*

Fore wing with disc and basal part toward inner margin whitish with contrasting dark veins; Sc lost; male without secondary sexual characters. . . . . *fusiformis*

1181 HYALEUCEREA LUCTUOSA Möschler

*Heliura luctuosa* Msch. Verh. z.-b. Ges. Wien xxvii, 642, 8: 13, 1877.

Body metallic green, wings and dorsal hair blackish. No markings, approaching *Episcepsis*.

July 20 (Friedman.) Surinam (type); Colombia.

### 1183 HYALEUCEREA FUSIFORMIS Walker

*Pampa fusiformis* Wlk. List. Lep. Ins. Br. Mus. vii, 1629, 1856.

*Figured:* Hamps. fig. 284; Seitz 26: b4.

Three pairs of scarlet dots on head and thorax; under side spotted with white.

June 25 (Fried.) Oct. 31 (Bts.). Ranges to the Amazons.

## NOLIDÆ

Head with beak-like palpi, moderate tongue, and no ocelli. Thorax with tympanum (Richards, Ent. Am. xiii, 33, fig. 151) of *Erastrine* type, the hood very small and above spiracle, fore wing with 4-branched Cu, hind wing frequently 3-branched by fusion of  $M_3$  and  $Cu_1$ ; scaling soft, the fore wing with raised tufts (usually 3); Sc of hind wing moderately fused with cell. Larva distinctive, only one subdorsal wart on each abdominal segment, and first pair of prolegs lost; living in a folded leaf as a rule. Pupa in a cocoon with a vertical slit-like valve (as in the *Sarrothripinæ*).

A distinct and very homogeneous little family, treated by Dyar among the "micros", by Hampson as a mere subfamily of *Arctiuidæ*. The condition of tympanum and the cocoon show a distinct connection with the intermediate *Noctuidæ*, so the likeness to the *Lithosiinæ* must be parallelism.

All the Central American species are closely related and might well be left in a single genus (*Nola*) but are here allowed to stand in the three genera recognized by Hampson. The final fork of  $R_3$  and  $R_4$ , or  $R_2$  and  $R_{3+4}$  has generally been overlooked, so several species have had to be transferred to a different genus, unless we abandon separation. There are more striking differences in the modification of the male radial system that were mostly overlooked by Hampson. I believe the species that have them are all *Ræselias*, forming the subgenus *Nolidia*, though the one or two studied by Hampson were put by him in *Nola*.

The *Ræselias* have their principal flight in November; the three *Nolas* were all taken in October.

## SEASONAL RECORD OF BARRO COLORADO ISLAND ARCTIIDS

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Six spec. coll. by Fairchild July-Aug. also.

1. Fore wing with all radials preserved,  $R_3$  sometimes very short, and leaving  $R_4$  just before margin.....*Ræselia*  
Fore wing with  $R_3$  and  $R_4$  united,  $R_2$  separate, but sometimes very short and leaving  $R_{3+4}$  just before margin, typically distinct. *Nola*  
Fore wing with  $R_2$ ,  $R_3$  and  $R_4$  united (none yet found from the Canal Zone that definitely belong here).....*Celama*

### *Direct Key to Species*

1. Fore wing with outer half contrasting blackish, containing the two outer scale-tufts, which are lead gray.....*habrophyes*  
Outer half of fore wing concolorous, or with narrow dark border only.....2
2. The two outer cell-tufts close together, lead gray, and contained in a common dark brown patch, which may extend narrowly to inner margin.....*mesographa*  
The three cell-tufts normally evenly spaced,—if the two outer are contained in a common brown patch this patch extends to base.....3
3. Fore wing pure white to subterminal line, the postmedial line obsolete.....*pernitens*  
Postmedial line distinct, the ground rarely pure white.....4
4. Median and postmedial lines both distinct, separate, fine and dark toward inner margin.....5  
Median and postmedial lines not both distinct toward inner margin, if both present diffuse and partly fused.....7
5. Median line deeply scalloped, the postmedial double and evenly sinuate.....*polyodonta*  
Median line even or moderately scalloped; postmedial single....6
6. Expanse under 12 mm., median line nearly straight below cell, in contrast with the strongly sinuous postmedian....*prothyma*  
Expanse over 12 mm.; median and postmedial line parallel or nearly so, the medial normally excurved and waved....*melletes*
7. Larger species,  $R_2$  deeply cleft from  $R_{3+4}$ , which fork, tho' sometimes only at extreme margin.....8  
Smaller species;  $R_2$  at most a minute fork on  $R_{3+4}$ , which are united.....10
8. Larger, white and cold gray; the tufts iridescent with lemon yellow in a favorable light, the outer one marked by a triangular dark gray spot on costa.....9  
Smaller, ground luteous, and markings more diffuse and decidedly



- brownish, the spot before the second tuft squarish, and no lemon yellow tint. . . . . *æschyntela*
9. Only the outer tuft accompanied with a triangular spot on costa, collar with subbasal and subterminal blackish bars, in one specimen fused into a large black spot, leaving only the tips whitish; tufts decidedly yellow. . . . . *patina*
- Both tufts accompanied by less intense gray triangles, so that the whole costa from base to  $2/3$  is darkened; collar suffused with gray. . . . . *recedens*
10. Costa with a broad pale portion separating the bar at second tuft from the triangle at the third tuft; outer and inner margins gray and white, without any brown tint. . . . . *sylpha*
- Costa well infuscated to beyond middle, only interrupted by a narrow whitish bar beyond first tuft; outer and inner margins and scutellum strongly shaded with luteous. . . . . *n. sp.*

### RÆSELIA Hübner

In all the New World species the male antennæ are pectinate to about  $2/3$ .  $M_3$  and  $Cu_1$  of hind wing may be stalked or united; the fore wing may have the accessory cell normal, minute (usually, at least in ♀) or absent. Some males have a fovea in outer part of cell, and another between  $R_1$  and  $R_2$ , distorting the venation. The apical fork of  $R_3$  and  $R_4$  is often extremely short and has been overlooked, causing the species to be put in *Nola*.

GROUP I: Tufts of fore wing shining lead gray, the second tuft nearer the outer than the inner, and accompanied by a smaller tuft nearer costa; male with foveæ in cell and below  $R_1$ , distorting the venation, which has the R-stem and  $M_1$  at base swollen, close together and distorted; accessory cell absent in male, minute, triangular and resting on apex of discal cell in female; terminal free part of  $R_3$  minute.

### RÆSELIA HABROPHYES Dyar

*Nola habrophytes* Dyar, Proc. U. S. Nat. Mus. xlvii, 248, 1914.

*Figured:* Seitz 66: b1.

This differs from the other similarly marked neotropical *Nolidæ* by the second tuft being included in the black border. There are many raised scattered lead scales, besides the regular tufts. Hind wing with  $M_3$  and  $Cu_1$  united.

Oct. 11 to Jan. 13 (see diagram). Trinidad River (Busck).

## 66a RÆSELIA MESOGRAPHIA Schaus

*Nola mesographa* Schs. Proc. U. S. Nat. Mus. xxix, 195, 1905.

*Figured:* Hamps. Suppl. 23: 30; Seitz 32: a2.

The median black area varies in development, but is most typically a black bar across the wing.  $M_3$  and  $Cu_1$  of hind wing stalked.

Nov.-Feb. (see diagram). Ranges to Southern Brazil.

GROUP II. Tufts of fore wing largely white, more or less mixed with light gray and brown, equally spaced, or in *R. æschyntela* the middle one a little nearer the basal; frequently with light lemon yellow iridescence; no extra tuft between second one and costa; foveæ rarely so much developed as to make R and  $M_1$  approximate (*patina*); accessory cell usually present in both sexes and large in female.

## 140 RÆSELIA PATINA Druce

*Nola patina* Dr. Biol. Centr. Am. Het. i, 140, 13: 19, 1885.

Also *figured:* Seitz 32: e6 (enlarged).

Middle tufts nearer basal than apical; foveæ as in preceding group, Rs turning down sharply from the nearly straight  $R_1$  and much thickened; female with  $M_1$  also close to Rs. No accessory cell. Hind wing with  $M_3$  and  $Cu_1$  stalked.

Markings light and rather clear (much whiter than the Seitz figure); antemedial line excurved below tuft, postmedial single, sinuate but not dentate.

Dominant in Nov. (see diagram). Costa Rica.

## RÆSELIA ÆSCHYNTELA Dyar

*Nola æschyntela* Dyar, Proc. U. S. Nat. Mus. xlvii, 246, 1914.

*Figured:* Seitz 67: c4.

Foveæ as in Group I (♀ not seen)  $M_1$  not closely approximate; second tuft central; fork of  $R_2$  strong;  $M_3$  and  $Cu_1$  of hind wing united. Markings blurred, the combined median and postmedia toward inner margin making a thick bar.

Oct. 27, Nov. 3, 29 (Bts.) all ♂. Described from the Canal Zone.

## RÆSELIA MELLETERES Dyar

*R. melletes* Dyar, Proc. U. S. Nat. Mus. xlvii, 245, 1914.

*Figured:* Seitz 66: d6.

Foveæ slight but distinct, the base of  $R_1$  sharply curved to make room for the fovea below it; the main R-stem nearly straight, and with a lance-like accessory cell at end of discal cell. Tufts stocky, the second rather nearer the third; hind wing with  $M_3$  and  $Cu_1$  united.

Subterminal line deeply dentate, and broken, formed of 3 oblique blackish dashes, more sharply defined than in *R. limona* Schs. from Costa Rica.

Lancetilla, Honduras, (Bates). Described from Canal Zone.

#### RÆSELIA PROTHYMA Dyar

*Nola prothyma* Dyar, Proc. U. S. Nat. Mus. xlvii, 247, 1914.

*Figured:* Seitz 66: c1.

Easily recognized by the minute size and fine clean lines. *Nola joanna* Schaus is very close, but has a different antemedial line, and darker costal edge and fringe.

Oct. 12 (Bates). Described from the Canal Zone.

#### 107a RÆSELIA POLYDONTA Schaus

*R. polydonta* Schs. Proc. U. S. Nat. Mus. xxix, 195, 1905.

*Figured:* Hamps. Suppl. 24: 20; Seitz 32: c7.

The triple median-postmedial lines on a white ground separate this species from any other in Panama; the male has a brown shade on basal half of costa. *R. bifiliferata* Walker is very close, but the antemedial line is more oblique and more distinctly double.

Male with  $R_3$  minute or absent (only one male at hand from Barro Colorado);  $R_1$  and  $M_1$  widely separated; no distinct fovea; accessory cell absent (minute but present in the specimens of *R. bifiliferata* at hand); hind wing with  $M_3$  and  $Cu_1$  united. Female much larger, with  $R_3$  and accessory cell well developed.

Principal flight in October, the only male in Jan. (see diagram), Mar. (Bradley, Cornell). Lancetilla, Honduras, Apr. (Bts.). Mexico to Guiana, replaced by *R. bifiliferata* further south.

#### 106b RÆSELIA PERNITENS Schaus

*R. pernitens* Schs. Ann. Mag. Nat. Hist. (8) vii, 355, 1911.

*Figured:* Hamps. Suppl. p. 423, fig. 59.

Second tuft much reduced, pure white, the others blackish; fovea in cell distinct but short, but with no trace of the one below  $R_1$ ;  $R_1$  and  $R_s$

being normal, gradually divergent.  $M_1$  distant; acc. cell trapezoidal, based on costal side of discal cell; hind wing with  $M_3$  and  $Cu_1$  united.

Nov. 2, 16, 25 (Bts.) ♀ only, Apr. (Bradley, Cornell) 1 ♂; Hamburg Farm, Costa Rica (Dodge). Described from Costa Rica.

### NOLA Leach

Identical with the preceding genus, except for the complete loss of  $R_3$ . The costal venation is rarely if ever modified, and accessory cell lacking as a rule.

### NOLA RECEDENS Schaus

*N. recedens* Sch. Proc. U. S. Nat. Mus. lix, 354, 1921.

*Figured:* Seitz 56: c4.

A clear *Nola*, with  $R_2$  and  $R_4$  deeply forked, but no sign of  $R_3$ ; accessory cell present, small, but bearing  $R_1$  (♀),  $M_1$  widely separate. Superficially very close to *R. patina*.

Nov. 29 (Bates) 1 ♀. Described from Guatemala.

### NOLA SYLPHA Dyar

*Celama sylpha* Dyar, Proc. U. S. Nat. Mus. xlvii, 248, 1914.

*Figured:* Seitz 66: d2.

This little species is rather common in some places in northern South America; it is marked superficially by appearing to have large yellow-gray blotches representing the orb. and ren. Postmedial more evenly oblique than in the preceding.

No fovea or acc. cell, hind wing with  $M_3$  and  $Cu_1$  united.

Oct. 27, 30 (Bts.). Described from the Canal Zone. Also Guiana and Amazons (Cornell).

There is a single broken female of another species of the same group of *Nola*. Dyar has described numerous further species from the Canal Zone in Proc. U. S. Nat. Mus. xlvii, 245-248, 1914.

## ARCTIIDÆ

Head variable. Thorax as in the *Euchromiidae*, the tympanic hood normally similar, but frequently reduced; never well developed and surrounding the spiracle. Venation of fore wing as in *Euchromiidae*, but hind wing with *Sc* normally preserved, in the *Phegopterinae* as a

rule not reaching the margin, and rarely absent; R sometimes also completely fused with  $M_1$ ,  $M_2$  normally quadrid, sometimes stalked or united with  $M_3$ , but never obsolescent from angle of discocellular. Metascutellum commonly less prominent than in the *Euchromiidae*. Larva as in the *Euchromiidae*, but usually with two separate subdorsal warts each on meso- and metathorax, frequently with hair reduced, but at least with two setae on wart iii of abdomen; pencils usual in the *Phegopterinae*, but not showing the massive lateral pair on first abdominal segment, which is so common in the *Euchromiidae*. Pupa various.

In the normal groups, here treated as *Arctiidae*, Sc and R of the hind wing are separate at the extreme base, or rarely fused, and much swollen, then fused for half, more or less, of the length of the cell, but separate before its end, with few exceptions; in the *Pericopidae* and *Hypsidæ* the fusion is slight or none, but many workers would now add these groups to the *Arctiidae*, since the tympanum and early stages are the same.

The two subfamilies are sometimes treated as separate families, the general line of evolution being quite different, but in technical characters the only final difference is the loss of the ocellus in the *Lithosiinae*;—in fact *Lerina*, which is a member of the *Phegopterine* *Arctiinae* in every other way, has lost the ocellus, while a rudiment is preserved in *Hypoprepia*, which is otherwise a normal *Lithosiid*. Both subfamilies are world-wide, but the *Lithosiinae* are weak in the nearctic. Of the subgroups, the *Phegopterini* are strictly new-world, unless *Rhodogastria* belongs to them, as the tympanum and hind wing would suggest, though the larva resembles *Utetheisa*; the *Arctiini* are overwhelmingly North Temperate, but with scattered types in the tropics; the *Utetheisini* are Old-world, save for the single genus *Utetheisa*, which must be a recent comer in the New. The classification of the *Lithosiinae* is too uncertain to make discussion of value, but the typical *Lithosia* group is certainly found in both hemispheres (*Agylla*), and the *Hypoprepia* group is strictly New-world (*Diarhabdosia*). The genera are practically all distinct in the two hemispheres.

### Subfamily LITHOSIINÆ

Ocellus absent. Weak forms, frequently with long palpi and reduced venation. Scaling generally soft; tympanum frequently with hood reduced or lost; tongue generally strong. Larva with the subdorsal warts on meso- and metathorax when distinct, obliquely or longitudi-

nally placed; the hair usually more or less reduced; food almost always mosses or lichens. Pupa not studied.

A group very characteristic of humid areas, sluggish in flight and usually occurring in small colonies. Some of the species have very small areas of distribution, but more generally colonies repeat over a wide area in suitable environments. Many more species will certainly be found on Barro Colorado Id.

### Key to Genera

1. Fore wing with  $R_5$  free, there being two free veins between the forked apical one and the end of the cell. . . . . *Metallosia*  
Fore wing with  $R_5$  stalked with  $R_{3+4}$ , or with one or two radial veins lost. . . . . 2
2. Hind wing with a dorsal vein absent. . . . . 3  
Hind wing with all veins present or R and  $M_1$  united. . . . . 16
3. Fore wing with accessory cell. . . . . *Apistosia*  
Fore wing with  $R_{3-5}$  simply stalked or united. . . . . 4
4. Fore wing with  $M_2$  and  $M_3$  stalked and hind wing with R and  $M_1$  united. . . . . *Lycomorphodes*  
Fore wing with  $M_2$  and  $M_3$  normally separate, occasionally connate or short-stalked when R and  $M_1$  of hind wing are stalked. . . . 5
5. Fore wing with a radial vein lost;  $R_3$  and  $R_5$  stalked; hind with R and  $M_1$ ,  $M_2$  and  $Cu_1$  stalked. . . . . *Serincia*  
Fore wing with all veins. . . . . 6
6.  $R_4$  and  $R_5$  united beyond the origin of  $R_3$ . . . . . 7  
 $R_3$  and  $R_4$  united beyond the origin of  $R_5$ . . . . . 12
7. Hind wing with only two veins from lower angle of cell, and none from middle of end of cell ( $M_2$  and  $Cu_1$  united). . . . . 8  
Hind wing with 3 dorsal veins. . . . . 10
8. Fore wing with Sc and  $R_1$  anastomosing,  $M_1$  free. . . . . *Odozana*  
Fore wing with Sc and  $R_1$  free. . . . . 9
9.  $M_1$  stalked on R-stem. . . . . *Phaulosia* (*Saozana*)  
 $M_1$  free. . . . . *Geridixis*
10. Palpi minute, not reaching front; hind wing with R and  $M_1$  stalked. . . . . *Diarhabdosia*  
Palpi moderate, extending well beyond base of front. . . . . 11
11. Fore wing with  $R_1$  free, hind wing with R and  $M_1$  stalked.

*Palaozana*<sup>1</sup>

<sup>1</sup> *Mulona* would run here, but has R and  $M_1$  of hind wing free. The supposed *Mulona* of the mainland (*phelina*) has  $M_2$  distinctly preserved in the hind wing, though a little weak, and is certainly not related. It will lie rather between *Nodozana* and *Gaudeator*. The *Mulona* group appears to be limited in the New World to the West Indies.

- Fore wing with  $R_1$  running into  $Sc$ ; hind wing with  $R$  and  $M_1$  stalked. . . . . *Paraprepia*
12. Hind wing with  $R$  and  $M_1$  united. . . . . 15  
 Hind wing with  $R$  and  $M_1$  stalked. . . . . 13  
 Hind wing with  $R$  and  $M_1$  separate. . . . . *Gardinia*
13. Fore wing with  $M_2$  and  $M_3$  separate. . . . . 14  
 Fore wing with  $M_2$  and  $M_3$  connate, hind wing with  $R$  and  $M_1$  short-stalked. . . . . *Ardonea*
14. Costa of fore wing arched,  $Sc$  and  $R_1$  anastomosing. . . . *Barsinella*  
 Costa of fore wing straight, the wing narrower;  $Sc$  and  $R_1$  free. . . . *Callisthenia*
15. Fore wing normal in form. . . . . *Talara*  
 Fore wing with outer margin oblique and concave at middle. . . . . *Dolichesia*
16. Accessory cell present. . . . . *Agylla*  
 No accessory cell,  $R_{3-5}$  stalked or partly united. . . . . 17
17. Fore wing with  $R_2$  stalked beyond origin of  $R_5$ . . . . . 18  
 Fore wing with  $R_2$  from cell. . . . . 19
18. Fore wing with  $M_3$  and  $Cu_1$  separate. . . . . *Anæne*  
 Fore wing with  $M_3$  and  $Cu_1$  stalked. . . . . *Dixanæne*
19. Fore wing with  $R_5$  stalked beyond origin of  $R_3$ , or one or two radials lost. . . . . 20  
 Fore wing with  $R_3$  stalked beyond the origin of  $R_5$ . . . . . 24
20. Hind tibiae with end spurs only preserved; front very narrow below between eyes, and palpi and tongue minute. . . . . *Thyone*  
 Hind tibiae with both pairs of spurs; tongue and palpi normal. 21
21. Hind wing with  $M_3$  and  $Cu_1$  distinctly separated; palpi upturned; markings generally complex. . . . . 22  
 Hind wing with  $M_3$  and  $Cu_1$  connate or shortly stalked; palpi more porrect. . . . . 23
22. Fore wing with one radial lost, only one rising separately from cell. . . . . *Afrida*  
 Fore wing with all radials present, two rising separately from cell. . . . *Clemensia*
23. Fore wing with  $M_2$  nearly straight and arising nearly equi-distant between  $M_1$  and  $M_3$ . . . . . *Gaudeator*<sup>1</sup>  
 Fore wing with  $M_2$  arising close to  $M_3$ , and curved up. . . *Nodozana*
24. Hind wing with  $M_3$  and  $Cu_1$  stalked (united in some species not yet taken in the Canal Zone). . . . . *Prepiella*

<sup>1</sup> "*Mulona*" *phelina* will run here; it is distinguished by the straighter costa and entirely different pattern.



- Hind wing with  $Cu_1$  and  $Cu_2$  stalked . . . . . *Gardinia*  
Hind wing with  $M_3$  and  $Cu_1$  arising close together but separate,  
 $M_3$  sometimes stalked with  $M_2$  . . . . . 25
25. Fore wing with  $R_1$  anastomosing or running into Sc, the venation  
otherwise normal. Antenna with shaft smooth; hind tibia with  
four spurs; R not stalked in hind wing . . . . . *Antona*  
 $R_1$  free from Sc; otherwise as before (occasionally *Hypareva* may  
have Sc and  $R_1$  anastomosing and will run to Balbura, but is an  
entirely different looking form, mainly white) . . . . . 26
26. Fore wing with  $M_2$  and  $M_3$  stalked; markedly in female, sometimes  
merely connate in male, which has fore wing with disarranged  
sex-scaling; palpi short . . . . . *Hypareva*  
Fore wing with  $M_2$  and  $M_3$  from cell;  $Cu_2$  normal, palpi moderate,  
upturned . . . . . 27
27. Hind wing with  $M_3$  and  $Cu_1$  distinctly separate . . . . . *Illice*  
Hind wing with  $M_3$  and  $Cu_1$  connate, from the extended lower  
angle of the cell . . . . . some specimens of *Prepiella aurea*

#### HYPAREVA Hampson

This genus, with *Agylla* and *Apistosia*, belongs to the typical *Lithosia* group, marked by a tendency to narrow the wings, generally pale colors, very frequently with a dark stripe on the thorax and inner margin, and frequently some dorsal veins of the fore wing lost (none in the present genera). Most of the few known larvæ have large warts, with numerous sparse weak hairs, and brilliantly patterned skins; on the thorax the two upper warts are almost longitudinally placed, unlike the *Arctiinae*.

Venation curiously unstable; Sc and  $R_1$  normally approximate, occasionally running together,  $R_3$  and  $R_4$  stalked the farthest (one exception at hand),  $M_2$  and  $M_3$  stalked for a very variable distance (occasionally connate), hind wing with  $M_2$  and  $M_3$  long stalked, or rarely united. In the single known species the male has much more triangular wings, overlaid with pearl gray sex-scaling, which soon fades to a dirty clay color, a shaggy tuft on under side of fore wing, gland on hind wing, fringe on fore femur, etc.

#### 291 HYPAREVA POGONODA Hampson

*H. pogonoda* Hmps. Cat. Lep. Phal. ii, 192, fig. 112.

Also figured: Seitz 37: 13 ♂.

The female is narrow-winged; plain white, or a little infuscated along inner margin.

Oct. 1 (Bts.). Lancetilla, Honduras (Bts.). Ranges from Mexico to Surinam, where it is abundant.

AGYLLA Walker (*Arcva* auct., *Crambomorpha* Walker)

This genus is presumably ancestral to the whole *Lithosia* group, having preserved a complete venation and the accessory cell. Many species have sex tufting or glands, on wings, body or legs, and a few have narrowly pectinate antennæ. Further species should be discovered on the Island.

1. Front black, contrasting; fore wing with inner margin at most gray at middle; male antennæ narrowly pectinate.....2  
Front paler than vertex, except in *A. separata* which has the inner margin gray; male antenna ciliate .....4
2. Expanse about 30 mm.; vertex black, collar and occiput yellow; antennæ broader.....*zucarina*  
Expanse about 40 mm.; vertex as well as occiput light, collar white or light gray; antennæ narrower .....3
3. Vertex cream; costal edge of fore wing narrowly yellow in male.  
*niphostibes*  
Vertex yellow; costal edge broadly yellow in male, narrowly in female.....*nivea*
4. Fore wing with inner margin contrasting gray below the fold....5  
Inner margin very slightly darkened or not at all; male abdomen covered with shaggy buff hair.....*sericea*
5. Male abdomen with massive black anal tuft; dorsal stripe broad..6  
Male abdomen with lengthened yellow valves, ground tinted with yellowish; female with naked middorsal spot on penultimate segment; fore wing of both with narrow gray dorsal stripe.  
*separata*
6. Under side of male fore wing dominantly fuscous, the region beyond lower angle of cell fuscous; also apex of hind wing.  
*marginata*  
Under side of male fore wing light yellowish, blackish only along inner margin; no fuscous on hind wing.....*bioptra*

399 AGYLLA ZUCARINA Dognin

*Macrocrambus zucarina* Dgn. Ann. Soc. Ent. Belge xxxviii, 123, 1894.

*Figured:* Dognin, Lep. Loja 11: 8; Seitz 37: b6.

Easily distinguished by the black head. The male antennæ are broader than in the related species.

Mar. 9 (A.M.N.H.) 1 bad ♀. Chiriqui to Peru.

#### 400.1a AGYLLA NIVEA VIRGINEA Schaus

(*Lithosia nivea* Wlk. List Lep. Ins. Br. Mus. vii, 1778, 1856.)

(Figured: Hamps. fig. 115; Seitz 37: c1 (typical); Dognin, Lep. Loja 11: 6, 6a (ab. *plateada* Dgn.), 5 (ab. *floreccilla* Dgn.))

*Crambomorpha argentea* Fld. Reise Novara Lep. 106: 10, 1874.

*Crambomorpha virginea* Schs. Proc. Zoöl. Soc. 1894, 240.

Not *Salapola argentea* Wlk. List Lep. Ins. Br. Mus. xxviii, 525, 1863, which is also an *Agylla* (Hamps. p. 200).

In *A.n. virginea* the head is yellow and front of thorax fuscous, in the type form they are white.

Mar. 9 (A.M.N.H.) one female appears to belong to this species, which ranges from Mexico to southern Brazil.

#### 429 AGYLLA SEPARATA Schaus

*Choria separata* Schs. Proc. Zoöl. Soc. 1894, 240.

(Figured: Hamps. fig. 126; Seitz 37: i2.

The dark face would put this species in the *argentea* group, but the antennæ are simple.

Mar. 9 (A.M.N.H.). Chiriqui to southern Brazil.

#### 418 AGYLLA MARGINATA Druce

*Areva marginata* Dr. Biol. Centr. Am. Het. i, 133, 1885.

(Figured: Hamps. 24: 8 ♂.

Upper side of head and body as well as inner margin of fore wings light gray. Our specimens are smaller than typical *marginata* (20-23 mm.), and may be merely a dark variant of the following. In any case I can see no difference in the ♀. The darkest male happens to be the smallest.

Male dates Oct. 10-Nov. 13. Diagram (p. 163) of this species and the following combined on account of the impossibility of separating females. Typical *marginata* is reported from Mexico to Costa Rica.

#### AGYLLA BIOPTERA Dyar

*A. bioptera* Dyar, Proc. U. S. Nat. Mus. xlvii, 164, 1914.

(Figured: Seitz 66: 18.

Differs only in the paler male under side.

Male dates Oct. 28-Jan. 27. Described from the Canal Zone.

Dyar describes *A. niphostibes* from the Canal Zone (Seitz 66: 110). It is large and pure white. *A. argentifera* Wlk. also covers the Zone in its range. It is very close to *niphostibes*, but the male has an oblique gray splash near inner margin.

#### 423 AGYLLA SERICEA Druce

*Crambomorpha sericea* Dr. Biol. Centr. Am. Het. i, 132, 1885.

Figured: Maassens Reise Sud.-Am. Lep. 4: 27 (as *Mieza galactina*); Seitz 37: f4 ♀.

Nov.-Apr. Lancetilla, Honduras (Bts.). Mexico to Peru, the closely related species or subspecies *petrola* in Brazil.

Dyar reports *Aptilosia crocea* from the Canal Zone on the basis of a couple of females only. I have examined them and believe they are females of this species with a little more gray shading than usual on the inner margin. The male will be needed for certainty. In the true *Aptilosia* the male is yellow, with venation of *Hypareva*, but no sex-scaling on fore wing, and both sexes have the gray on inner margin broad.

*Ardonea morio* Wlk. has been taken at the R. Indio de Chagres. It is immaculate deep blue (Seitz 36: d6).

#### APISTOSIA Hübner

Differs from *Agylla* only in the union of  $M_2$  and  $M_3$  of the hind wing. Most species resemble *Agylla*, but the following (the genotype) differs in color.

#### 467 APISTOSIA JUDAS Hübner

*Hipocrita judas* Hübner, Erste Zutr. (1808 as n. nud., validated by publication of plate 1808-1814, changed to *Apistosis* in definitive text 1818), Zutr. Exot. Schm. i, 13, 9: 51-52.

Also figured: Hamps. fig. 146; Seitz 36: e3.

Bronze green with pale fringe; head and dorsum of thorax orange. Male antennæ pectinate.

Apr. 28-May. Guatemala to Tucuman, Argentina.

Dyar reports *Gardinia magnifica* Walker (Seitz 65: i3) from the Canal Zone. It stands in present arrangements by itself, but the tympanum and all female characters are normal *Lithosiid*. In the male

the hind wing has the cell much shortened in front, with R, M<sub>1</sub> and M<sub>2</sub> approximate from the tip of the R-stem, Cu wholly independent, and forked, M<sub>3</sub> lost. It is unicolorous green-black.

He also reports *Achroosia nuda* Hamps. (Seitz 26: a3); it is pure white, with broader wings than *Thyone alba*. The present collection contains a specimen from Lancetilla, Tela, Honduras. It was described from Brazil.

#### ANTONA Walker (with *Balbura* Walker)

All the species of this genus but the genotype, have striking black streaks between (not on) the veins, and the one in the end of the cell and that above M<sub>2</sub> are often continuous. *Antona* is supposed to have M<sub>2</sub> and M<sub>3</sub> of hind wing separate and *Balbura* stalked; but in fact "*Antona*" *diffinis* and "*Balbura*" *interrenata* are merely subspecies, both having the pattern of *Balbura* and the separate M<sub>2</sub> and M<sub>3</sub> of *Antona*.

1. Collar orange, concolorous with rest of thorax . . . . . *dorsisigna*  
Collar black, like head, contrasting with rest of thorax.

*interrenata*

#### 719 ANTONA DORSISIGNA Walker

*Balbura dorsisigna* Wlk. List Lep. Ins. Br. Mus. ii, 481, 1854.

*Figured*: Hamps. fig. 245; Seitz 32: i5.

Male with anal angle slightly lobed, M<sub>2</sub> and M<sub>3</sub> stalked. Fore wing with an orange basal spot (not shown in the Seitz figure).

Nov. 11, Dec. 14, (Bts.), Apr. 6 (Fried.), July-Aug. (Fair.). Honduras to Guiana.

#### 719b ANTONA INTERVENATA Schaus

*Balbura interrenata* Schs. Ann. Mag. Nat. Hist. (8) vii, 362, 1911.

*Figured*: Hamps. Suppl. 34: 6; Seitz 35: a2.

A mere subspecies of *A. diffinis* Walker, which has the disc of the thorax darker (chestnut, not black as stated) and comes from Guiana.

Oct. 26-Apr. (see diagram, p. 163). Described from Costa Rica.

#### THYONE Walker

A delicate little genus, typically with enormous eyes, almost meeting below. The genus appears isolated, but may have some connection with *Lithosia*. The white species differ in the male antennæ but deter-

minations are in confusion. The following species is certainly *alba* Dr. and may be the true *simplex* Wlk., but is certainly not the species that goes for *simplex* (*parvita* Schs.). Even examination of the types will not clear up the case as they are mostly females.<sup>1</sup>

1. Gray; antennæ blue-black, simple.....*griseus*  
 White; antennæ white on basal half, subpectinate.....*alba*

### 731b THYONE GRISEUS Schaus

*T. griseus* Schs. Ann. Mag. Nat. Hist. (8) vii, 362, 1911.

*Figured*: Hamps. Suppl. 34: 6; Seitz 35: a2.

Immaculate, the legs a little and antennæ much darker.

Oct.-Jan. (Bts.) (see diagram, p. 163). Costa Rica (type).

### 734 (in part) THYONE ALBA Druce

*Lithosia alba* Dr. Biol. Centr. Am. Het. i, 131, 1885.

? *Thyone simplex* Wlk. List Lep. Ins. Br. Mus. ii, 553, 1854.

(Not *Thyone simplex* of Hamps. fig. 255, which appears to be *T. parvita* Schaus.)

White, even the front white; fore legs and base of costal edge gray; tips of antennæ usually more or less gray.

Oct. 12-Dec. 21 (Bts.). Mar. 29-Apr. 4 (Bradley, Cornell) see diagram. Outside distribution uncertain through confusion with other species, all the South American material at hand being other species. *T. simplex* was described from Honduras, *alba* from Panama.

Dyar describes *Afrida gymnes* (Seitz 35: b9) and *pnixis* (Seitz 35: b5) from the Canal Zone. The latter has a contrasting blackish base.

### ODOZANA Walker

This is the beginning of the large *Illice* group, typical of the two Americas. They are all small, usually brightly colored, with well developed palpi and usually with venation of fore wing complete and

<sup>1</sup> The white species at hand may be separated as follows:

1. Antennæ broadly pectinate on basal half.....*new species* (Guiana etc.)
- Antennæ simple or subpectinate..... 2
2. Antennæ with a triangular ventral extension of each segment, twice as wide at tip as base,  
 looking subpectinate from above; scaling of shaft white on basal half, gray toward apex  
*alba*
- Antennæ with segments rounded, moniliform..... 3
3. Scaling of shaft white, the naked portions yellow.....*parvita*
- Scaling of shaft blackish; the naked parts dull brown.....*melanocera*

hind wing reduced. The larvæ are inconspicuous, with setæ mostly reduced to two or three to a wart; and feed on lichens.

Odozana has Sc and R<sub>1</sub> anastomosing, R<sub>5</sub> stalked beyond R<sub>3</sub> and hind wing with only two veins from lower angle of cell. Male with enormous abdominal tufts in the present species.

1. Disc of thorax orange, base of hind wing below costa and abdomen scarlet.....*sixola*  
 Whole thorax blue black; base of abdomen and whole hind wing blackish.....*decepta*

#### 743b ODOZANA SIXOLA Schaus

*O. sixola* Schs. Ann. Mag. Nat. Hist. (8) vii, 363, 1911.

*Figured:* Hamps. Suppl. 34: 36; Seitz 34: 11.

Collar black, but sides of prothorax orange. Dorsal terminal tufts yellow. Female with end of abdomen black.

Chief flight in Nov. (see diagram, p. 163). Costa Rica (type).

#### 743d ODOZANA DECEPTA Schaus

*O. decepta* Schs. Ann. Mag. Nat. Hist. (8) vii, 364, 1911.

*Figured:* Hamps. Suppl. 25: 2; Seitz 24: 5.

Head and thorax brilliant green; tufts mostly red, shorter and more massive than the preceding. Hind wing with red on fringes only.

Oct. to Feb. Costa Rica (type).

#### PHAULOSIA Walker (*Saozana* Dyar)

Female venation like the preceding except for the separation of Sc and stalking of M<sub>1</sub>. Appearance wholly different, the fore wing being dull colored, with complex pattern including an apical dot; apex marked and outer margin bent. The stalking of R and M<sub>1</sub> of hind wing seems to vary individually, as Dyar reports his specimen with them united, while ours and the B.M. ones are stalked.

Male (Hamps. Suppl. fig. 207) with costa of both wings fringed, and a blister on posterior edge of cell of fore wing and anterior side of hind wing. Hind wing deeply bilobed, the upper lobe with heavy sex-scaling both above and below, containing the whole preanal area. Only three veins arising from cell besides Sc.

I suspect our species is merely the local representative of *P. sordida* Btl., described from one bad ♀.



## 743a (749?) PHAULOSIA LEUCOTA Hampson

*Odozana leucota* Hmps. Ann. Mag. Nat. Hist. (7) viii, 184, 1901.

*Saozana l.* Dyar, Proc. U. S. Nat. Mus. xlvii, 172, 1914.

*Figured:* Hamps. Suppl. p. 663, fig. 207; Seitz 34: 19.

? *Phaulosia sordida* Btl. Trans. Ent. Soc. Lond. 1878, 55.

*Figured:* Hamps. fig. 267; 34: n3.

Ground light brown, marked with white and blackish, a blackish dot at lower angle of cell and an ocellate one at apex most conspicuous.

Nov. 20, 1 ♂, Dec. 25, 1 ♀ (Bts.); described from Panama and Costa Rica (*leucota*) and Amazons (*sordida*). French Guiana (Nat. Mus.).

## PREPIELLA Hampson

Like *Illice*, except that  $M_3$  and  $Cu_1$  of hind wing are stalked or united. The odd pattern, made up of transverse ordinary lines, black vein-lines in ante- and postmedial regions, and red cell spot on a yellow ground, is shared by some species of *Illice*, *Callisthenia*, *Talara*, *Barsinella*, etc.

1. Antennæ shortly pectinate in male, black; antemedial region with one of the black streaks on Sc. . . . . *pexicera*  
Antennæ simple, no streak on Sc. . . . . *aurea*

## 754 PREPIELLA PEXICERA Schaus

*P. pexicera* Schs. Jour. N. Y. Ent. Soc. vii, 215, 1899.

*Figured:* Hamps. fig. 271; Seitz 33: e10.

Black markings moderately heavy; streaks falling short of the black basal bar and terminal line; ordinary lines sometimes meeting below the red discal spot (the type very bad and not clear on this point). The female at hand has the lines separate and the discal spot accompanied by a second red spot below the cell.

Nov. 19, 28 (Bts.). Venezuela (type). Trinidad (Cornell).

## 755 PREPIELLA AUREA Butler

*Mæpha aurea* Btl. Trans. Ent. Soc. London 1878, 54.

*Figured:* Hamps. fig. 272 (venation incorrect, see Dyar' 14); Seitz 33: f1.

The red spot is massive, and black markings lighter;  $M_3$  and  $Cu_1$  are at most very shortly stalked, but the cell is drawn out in a point to meet them.

Oct.-Nov. (Bts.), Apr. (Friedman; also Cornell), July 22, Aug. 2 (Banks). Venezuela, Guiana and Upper Amazons.

### CALLISTHENIA Hampson

Wings narrower and more oblong than the preceding, especially the male which has a longitudinal fold through the cell, edged with enlarged scales. Pattern of *Prepiella*.

### CALLISTHENIA TRUNCATA, new species

Close to *C. plicata*. Longitudinal fold in cell extending straight out through end of cell (most easily seen as a ridge beneath) its upper side overhung with a ridge of enlarged scales which start at  $1/3$  cell, get larger outwardly and end abruptly just beyond upper angle of cell. They curve up and away from the groove, but I can see no trace of the continuation along  $R_3$  to costa figured by Hampson for *plicata*.

Yellow, with *Prepiella* pattern. Front black, a black bar between bases of antennæ, which are black except for a yellow subapical patch. Thorax with black tegulæ and mid-dorsal stripe, the latter widening to cover the whole scutellum; abdomen scarlet with yellow base, and massive preapical and apical tufts. Fore wing with veins heavily lined with purple-black, except in a triangle resting on base of inner margin, and median area. Extreme base black; median area narrow, wholly beyond middle of wing, interrupted by a heavy scarlet splash on end of cell; the black antemedial line bent out a little to touch the scarlet spot, and postmedial touching its upper and lower angles, bent out in a sharp semi-ellipse between, enclosing a spot of the yellow ground. Stripes on veins beyond postmedial continuous, joining the black fringe. Space between  $M_1$  and  $M_3$  a little wider than the others. Base of inner margin scarlet. Hind wing scarlet with yellow costa and black apex, the latter drop- or comma-shaped, formed of a rounded area at apex and a tail gradually narrowing toward anal angle. Under side yellow. Fore and middle coxæ black, contrasting, the rest of fore and middle legs black, cut with yellow; hind legs, including coxæ, mostly yellow; abdomen with 5 heavy black segmental bars. Under side of wings scarlet, the costal and dorsal areas of fore wings yellow; thick black streaks along costal edge and upper edge of cell joining in a spot which ends abruptly, leaving a costal yellow patch corresponding to the median fascia above. Apex (beyond m. fascia) solid black. Hind wing as above. 15 mm.

Barro Colorado Id., C.Z., Panama, Oct. 8 and Nov. 4 ♂, Nov. 8 ♀. (Bates).

Dyar described *Palæozana mida* from the Canal Zone (Seitz 66: i7). Fore wing dark, hind wing scarlet with black border; anal tuft fan-like.

### ILLICE Walker (*Cisthene*)

The central genus of this group, which seems to replace *Mittochrista* in the New World. Patterns are varied and lead up to the other related genera. Larvæ on lichens.

1. Fore wing yellow or greenish, marked with black.....2  
Ground of fore wing gray, marked with whitish.....5
2. Fore wing with longitudinal black bars in ante- and postmedial areas (Prepiella pattern).....3  
Fore wing with transverse green-black markings, mimicking Chrysomelidæ.....4
3. Antemedial striped area bounded on both sides by black lines, the basal area clear yellow.....*n. sp.*  
Antemedial stripes not connected by black at their basal ends, the yellow basal area small, as in *Prepiella*.  
some specimens of *Prepiella aurea*
4. Two broad peacock blue transverse fasciæ.....*opulentana*  
Two narrow fasciæ, crossed by a longitudinal fascia from antemedial to margin, with a more or less complete open circle at their intersection.....*citrina*
5. Fore wing with a longitudinal white stripe in fold.....*minuta*  
Fore wing with a white patch on costa, and inner margin with an interrupted white stripe.....*leuconotum*

### 790 ILLICE OPULENTANA Walker

*Mæpha opulentana* Wlk. List Lep. Ins. Br. Mus. xxx, 1014, 1864.

*Figured*: Hamps. 28: 11; Seitz 33: p6.

Bands surcharged with brilliant blue; antemedial with two brassy spots; postmedial narrow and broken. Hind wing light yellow (orange in the closely related *I. cræsus* Hmps.).

Oct. 30-Jan. (see diagram, p. 163), Apr. 6 (Bradley, Cornell). Described from the Amazons.

789, 789a *ILLICE CITRINA* Druce

♂ *Cisthene citrina* Dr. Biol. Centr., Am. Het. i, 124, 12: 14, 1885.

Also figured: Seitz 33: c2.

♀ *I. tessellata* Dognin, Mem. Soc. Ent. Belge xix, 127, 1912.

Figured: Hamps. Suppl. 35: 35; Seitz 33: c3.

I believe the Seitz figures are too brilliant, both sexes being greenish yellow, but perhaps brighter green when fresh. In the Nat. Mus. specimen of *citrina* ♂ the lower outer side of the little circle is open, in the female type, and the present 3 females it is complete.

Oct. 22, Nov. 25, Dec. 11 (Bts.). Lancetilla, Honduras (Bts.). Colombia.

There is a single specimen of an apparently new species, superficially almost like *Nodozana bellicula* Schs., but much larger and with the venation of *Illice*. Cornell has a second specimen (both females) from Surinam.

Dyar reports *I. minuta* Butler (Seitz 33: c3) and describes *I. leucota* (Seitz 66: i5) from the Canal Zone.

*NODOZANA* Hampson

Very close to *Illice*, but with  $R_5$  stalked beyond  $R_3$ .

1. Brown with three yellow patches. . . . . *thricophora*  
Ground pale. . . . . 2
2. White dusted with cream, with a blackish patch in fold. . . *albula*  
More dominantly cream, with a reddish patch. . . . . *picturata*

797 *NODOZANA THRICOPHORA* Hampson

*N. thricophora* Hmps. Cat. Lep. Phal. ii, 375, 1900.

Figured: Hamps. fig. 286; Seitz 34: g4.

Discal spot small, red, in the end of the pale costo-apical spot.

Oct. 10 (Bts.). Described from Chiriqui, Panama.

Dyar also reports *N. picturata* Schs. (Seitz 32: m9) and describes *N. albula* (Seitz 66: h4) from the Canal Zone. He also describes *Serincia* with *S. metallica* (Seitz 66: h3) from the Canal Zone. It has a green fore wing and black hind wing.

*GAUDEATOR* Dyar (*Nudur* Dyar)

Practically identical with *Nodozana*, but with a different type of pattern, and costa of fore wing more arched. *G* (?) *phelina* is inter-

mediate, having the wing form of *Nodozana*, the high  $M_2$  of *Gaudeator*, and a pattern unlike either. It is put here tentatively, but certainly does not belong with *Mulona*, either in geography or structure.

1. Black spotted on a cream ground.....*phelina*  
Gray banded on an orange ground.....2
2. Median stripe independent, running from base to outer margin.  
*fractivittarum*  
Median stripe starting from middle of antemedial and connected  
with costal half of postmedial.....*paidicus*

#### S24 GAUDEATOR (?) PHELINA Druce

*Autoceras phelina* Dr. Biol. Centr. Am. Het. i, 139, 13: 13, 1885.

Also figured: Seitz 34: c9.

Fore wing white with about 15 black dots; fringe and hind wing yellow. This species is aberrant, but perhaps fits here as well as anywhere.  $M_2$  is a little weak, but perfectly distinct (unlike *Mulona*, which also is purely Antillean). In Hampson's key it would run to the Old World genus *Chionama*, which is not closely related.

Oct.-Apr. (see diagram, p. 163). Described from Chiriqui. British Guiana (Cornell).

#### GAUDEATOR PAIDICUS Dyar

*G. paidicus* Dy. Proc. U. S. Nat. Mus. xlvii, 164, 1914.

Figured: Seitz 66: h2.

Antemedial line angled at its junction with the medial stripe, lower half of postmedial reduced to a spot.

Oct.-Dec., Apr. (see diagram). Only known from the Canal Zone.

#### GAUDEATOR FRACTIVITTARUM Dyar

*Nudur fractivittarum* Dy. Proc. U. S. Nat. Mus. xlvii, 368, 1914.

Figured: Seitz 66: k8.

Fore wing shaded with pink; antemedial and postmedial bands both represented by costal and dorsal dashes. Male type with two radials lost, the other specimens seen all normal.

Nov. 4 (Bts.), Apr. 18 (Fried.) both ♀. Mexico (type). Guatemala (U. S. Nat. Mus.).

## LYCOMORPHODES Hampson

Structure like *Talara*, except the stalked  $M_2$  and  $M_3$ . Pattern mimetic of Lycid beetles. Besides the mainland types, there is a Puerto Rico species, corresponding to the local *Correbidia strigosa*.

## 807 LYCOMORPHODES SORDIDA Butler

*Leptidule sordida* Btl. Trans. Ent. Soc. London 1877, 369.

*Figured:* Hamps. 28: 31; Seitz 34: h2 ♂, 3 ♀.

Dull orange, the darker apex of male cut by a pale dash, female with traces of a midcostal dark spot. The male has a massive coal black tuft on the fore tibia and should be transferred to Hampson's group I.

Oct.-Feb. (see diagram, p. 163); Lancetilla, Honduras, (Bts.). Mexico to Colombia.

## TALARA Walker

A reduction of *Illice*, with Sc and  $R_1$  of fore wing anastomosing, and R and  $M_1$  of hind wing fused.  $M_2$  and  $M_3$  of fore wing stalked in subgenus *Abrochocis*, and  $M_2$  and  $Cu_1$  of hind wing sometimes stalked. Patterns varied.

1. Fore wing with black ante- and postmedial lines, red veins and black dusting.....*esperanza*  
Fore wing with pale markings or no defined markings.....2
2. Fore wing scarlet.....*cara*  
Fore wing white, with two dorsal spots.....*mesospila*  
Fore wing gray or blackish.....3
3. Fore wing with irregular pale ante- and postmedial lines on a shaded light and dark gray ground.....4  
Fore wing with broad shades or practically immaculate.....5
4. Hind wing and body gray.....*phwella*  
Base of hind wing and body pink.....*mona*
5. Basal third or half of hind wing scarlet.....6  
Hind wing wholly dark.....7
6. Sides of neck orange; fore wing with vague paler and darker shading; male with most of anal tuft light.....*rufibasis*  
Sides of neck blackish, concolorous; fore wing with a sparse overlay of slender pale scales; male with whole anal end black.  
*violescens*

7. Fore wing more or less overlaid with black-tipped pale scales;  
 male with black sex-patch on hind wing. . . . . *melanosticta*  
 Fore wing evenly scaled; hind wing with  $M_2$  and  $M_3$ - $Cu_1$  wholly  
 united. . . . . *n. sp.*

Group I. *Fore wing with  $M_2$  and  $M_3$  stalked* (Abrochocis).

808a TALARA ESPERANZA Schaus

*T. esperanza* Schs. Ann. Mag. Nat. Hist. (8) vii, 365, 1911.

*Abrochocis e.* Dyar, Proc. U. S. Nat. Mus. xlvii, 170, 1914.

*Figured:* Hamps. Suppl. 36: 25; Seitz 32: n1.

The red veins on an orange ground are distinctive.

Oct. 14-Dec. 3 (Bts.), Apr. 4, 6 (Bradley, Cornell). Described from Costa Rica.

Group II.  *$M_2$  free in both wings* (Talara)

813b TALARA CARA Schaus

*T. cara* Schs. Ann. Mag. Nat. Hist. (8) vii, 365, 1911.

*Figured:* Hamps. Suppl. 37: 1; Seitz 33: o6.

The Barro Colorado specimens do not match any of the named forms exactly. In *cara* type the apical black is more extensive, but shades off into the ground as in these specimens (the figures are inaccurate).

*T. rubida* type is evenly crimson without the orange shades, and with no blackish, and *T. coccinea* and *miniata* have a defined median costal black patch.

Oct. 3-Dec. 3 (Bts.), Apr. 11 (Fried.). *T. cara* and *rubida* were described from Costa Rica.

816 TALARA RUFIBASIS Felder

♀ *Cisthene rufibasis* Fld. Reise Novara Lep. 139: 4, 1875.

Also figured: Seitz 34: c1, 66: g3 (as *minynthadia*).

♂ *T. minynthadia* Dyar, Proc. U. S. Nat. Mus. xlvii, 169, 1914.

Felder's original figure does not show the orange neck, but it is mentioned in Hampson's redescription. Dyar's type of *minynthadia* matches our male. The male is partly shaded with light gray.

Oct. 26 ♂, Dec. 24 ♀ (Bts.), Feb. 7, Mar. 13 (A.M.N.H.), Apr. 9 (Fried.), July 22 (Banks). Described from Colombia.



## TALARA VIOLESCENS Dyar

*T. violescens* Dy. Proc. U. S. Nat. Mus. xlvii, 169, 1914.

*Figured*: 66: g4.

The female lacks the black tail, and looks identical with the preceding except for the lack of the orange neck.

Oct. 28-Dec. 25 (Bts.), June 20 (Fried.). Described from the Canal Zone.

Group III. *Hind wing with M<sub>2</sub> stalked with M<sub>3</sub>-Cu<sub>1</sub>*

## TALARA MELANOSTICTA Dyar

♂ *T. melanosticta* Dy. Proc. U. S. Nat. Mus. xlvii, 169, 1914.

♀ ? *Lycomorphodes genificans* Dy. Proc. U. S. Nat. Mus. xlvii, 169, 1914.

Easily recognized by the black tipped white scales on the disc.

Oct. 12-29 (Bates), Apr. 4 (Bradley-Cornell), July (Banks). Described from the Canal Zone.

There is a single specimen of a plain mouse gray species, with M<sub>2</sub> and Cu<sub>1</sub> of hind wing united. Dyar also describes *T. mona* and *mesospila* from the Zone (Seitz 66: g8 and g5).

## S19 TALARA PHÆELLA Hampson

*T. phæella* Hmps. Cat. Lep. Phal. ii, 384, 1900, 28: 23.

Also *figured*: Seitz 32: m4.

Described as having M<sub>2</sub> and M<sub>3</sub>-Cu<sub>1</sub> connate, in our two specimens they are stalked. The darker gray forms patches at base of wing, costal half of median area, and subterminal costal and dorsal bars.

Nov. 14-15 (Bts.). Described from the Canal Zone.

Dyar describes *Barsinella desetta* from the Canal Zone (Seitz 67: b3). It is a small broad-winged species with the Prepiella pattern.

## DOLICHESIA Schaus

This genus differs from *Talara* in the different wing form and more woolly appearance. *Talara rufa* Schs. from Brazil also belongs to it.

## 72Sc DOLICHESIA FALSIMONIA Schaus

*D. falsimonia* Schs. Ann. Mag. Nat. Hist. (8) vii, 362, 1911.

*Figured*: Hamps. Suppl. fig. 202; Seitz 36: c6.

The fore wing is actually dull gray, obliquely banded in several shades.

Oct.-Dec. (see diagram, p. 163). Costa Rica (type).

### CLEMENSIA Packard

A broad winged and rather distinct little genus, with ample wings and the dorsal veins spaced, apparently representing the Old World *Nudaria* group, though more heavily scaled. Larva on lichens. There are a number of species in the Neotropical, all inconspicuous things, the North American *C. albata* being decidedly the most showy of the lot.

### 858 CLEMENSIA QUINQUEFERANA Walker

*Tospitis quinqueferana* Wlk. List Lep. Ins. Br. Mus. xxviii, 433, 1863.

Figured: Hamps. fig. 313; Seitz 33: m6.

A dull gray, brown or (when rubbed) luteous species, with slightly angled outer margin, and the markings mostly in the shape of marginal spots. Dyar considers the "species" mixed, and if so ours is probably not true *quinqueferana* from the Amazons; but the material seen is too poor to prove anything.

Nov. 1, Jan. 3 (Bts.). Mexico to S. Brazil.

### DIARHABDOSIA Hampson

This genus is a miniature version of the North American *Hypoprepia*, and with *Hæmatomis* forms another little group with reduced palpi. The larvæ feed as usual on lichens, and have most of the warts reduced to single bristles. The moths are excellent mimics of fireflies. The following species is very close to the Guiana *D. cora* Schs. but has a darker hind wing, sex for sex. By a curious chance all the Panama specimens of *coroides* are females (over 30 in all, from three different collections), while all the *cora* at hand, from the Guianas, are males.

### 1113b DIARHABDOSIA COROIDES Schaus

*D. coroides* Schs. Ann. Mag. Nat. Hist. (8) vii, 368, 1911.

Figured: Hamps. Suppl. 41: 20; Seitz 33: h5.

Scutellum gray, contrasting, hind wing half gray in male, almost wholly gray in female.

Oct.-Apr. (see diagram, p. 163), all females. Panama (U. S. Nat. Mus. and Hamps.), females only. Male seen from Costa Rica.

#### PARAPREPIA Dyar (*Parillice* Dyar)

Different in appearance from *Illice*, of which Hampson considers it a synonym. Blackish, with scarlet prothorax.

#### PARAPREPIA FUSCILINGUA Dyar

*P. fuscilingua* Dyar, Proc. U. S. Nat. Mus. xlvii, 168, 1914.

*Figured*: Seitz 66: i6.

Oct. 9, 10, 27 (Bts.). Described from the Canal Zone. The other species of the genus (*ruficollis* Schs.) comes from southern Brazil.

#### METALLOSIA Hampson

This is the only regional genus of a little group distinguished by having  $R_5$  free and at most  $R_3$  and  $R_4$  stalked. This genus and the other mainland genus, *Chrysozana*, have metallic coloring, the West Indian *Bænasa* and *Torycus* are dull.

#### METALLOSIA NITENS Schaus

*M. nitens* Schs. Ann. Mag. Nat. Hist. (8) vii, 369, 1911.

*Figured*: Hamps. Suppl. 42: 25.

The coloring and radial venation suggest the Glyphipterygidæ, but there is a normal tympanum, though no hood. Green; abdomen and hind wing dull black.

Jan. 12 (Bts.). The present specimen like the unique type from Costa Rica, is a female.

Dyar also describes the following genera and species from the Canal Zone: *Geridixis minor* (Seitz 66: g2). Venation of *Chrysochlorosia* with  $R_1$  free from Sc. White, with a large blackish dorsal patch.

*Anæne* with 4 species (Proc. U. S. Nat. Mus. xlvii, 171-172, Seitz 66: g 3-6) with peculiar elongate wing with oblique outer margin, and more Noctuid-like appearance.

*Dixanæne lepidocæna* (Seitz 66: f7). The only genus with  $M_3$  and  $Cu_1$  of fore wing stalked. Finely transversely striate with black and white—with brown ordinary lines, and median and postmedial areas partly overlaid with linear black scales.

## Subfamily ARCTIINÆ

Ocellus always present (except in *Lerina*), a little behind base of antenna, and rarely covered in dried specimens by shrinking inside the neck; body normally stout, typically with small head, short palpi and tongue, but with prominent head, palpi and tongue in the great majority of Neotropical species; thorax generally with a pair of glands secreting a colored but usually odorless liquid, most freely used in *Utetheisa*. The wings are usually strong and their scaling dense, the body frequently with shaggy hair at base. Tympanic hood always present, above spiracle, conspicuous above in some closely scaled forms, but not as large as in the *Pericopidæ*. Eggs heavily reticulated, spherical, laid in clusters. Larvæ social when young, usually scattering later; with dense tufts of hair (except a few latter genera), the two upper on meso- and metathorax vertically placed; pupa in a cocoon of felted hair (except a few latter genera), various.

A dominant group in all regions, the caterpillars conspicuous, active, and frequently general feeders; the early genera more often on plants with milky sap. Many are "Tussocks", having pencils of long hair at the ends and a less obvious middorsal series, but such are known only from the New World.

*Key to Genera*

1. Hind wing with a dorsal vein absent ( $M_3$  and  $Cu_1$  fused) . . . . . 2  
     Hind wing with four veins arising from lower angle and side of cell . . . . . 15
2. Fore wing with  $R_2$  stalked on  $R_{3-5}$  . . . . . 3  
     Fore wing with  $R_2$  stalked on  $R_1$ ; hind tibia with terminal spurs only . . . . . *Nezula*  
     Fore wing with  $R_2$  free or arising from accessory cell . . . . . 12
3. Fore wing with  $M_3$  arising from near end of cell, the width of cell  $M_3$  at base being  $1/3$  or less its width at margin . . . . . 4  
     Fore wing with  $M_3$  well separated from lower angle of cell . . . . . 6  
     Fore wing with  $M_3$  stalked with  $Cu_1$  . . . . . *Neonerita*
4. Palpi oblique and beak-like, the second segment not adapted to face; hind wing with  $R$  and  $M_1$  stalked, tongue weak . . . . . *Virbia*  
     Palpi with second segment concave and adapted to face; tongue strong . . . . . 5
5. Palpi as seen in direct front view extending up to middle of front (or level of middle of eye) . . . . . *Eupseudosoma*

- Palpi as seen from in front extending nearly to top of front and eye. *Premolis*
6. Hind wing with  $M_2$  and  $Cu_1$  stalked<sup>1</sup>. . . . . 7  
 Hind wing with  $M_2$  and  $Cu_1$  arising separately from cell. . . . . 9
7. Middle and hind tibiae with abundant loose hair. . . . . *Castrica*  
 Middle and hind tibiae closely scaled. . . . . 8
8. Vein closing cell of fore wing nearly vertical. . . . . *Phæomolis*  
 Vein closing cell of fore wing strongly oblique. . . . . *Robinsonia*
9. Fore wing with  $R_2$  arising beyond origin of  $R_5$ . . . . . 10  
 Fore wing with  $R_5$  arising beyond origin of  $R_2$ . . . . . 11
10. Palpus as seen in front view upturned to vertex. *Automolis citrea*  
 Palpus as seen in front view upturned to middle of front. . . *Idalus*
11. Hind wing with R and  $M_1$  free; tibiae spined. . . . . *Belemnia*  
 Hind wing with R and  $M_1$  stalked or united; tibiae not spined. *Automolis*
12. Hind wing with Sc aborted; pattern complex. . . . . *Thalesa*  
 Hind wing with Sc developed; pattern normally simple. . . . . 13
13.  $M_1$  free from R and  $M_2$  from  $Cu_1$ ; abdomen with some loose hair,  
 tending to avoid the midline. . . . . *Glaucostola*  
 $M_1$  or  $M_2$  or both stalked. . . . . 14
14.  $M_1$  stalked with R beyond the point of separation of  $M_2$  and  $Cu_1$   
 or completely united; abdomen smooth-scaled. . . . . *Parevia*  
 $M_2$  stalked with  $Cu_1$  beyond the point of separation of R and  $M_1$ ;  
 abdomen shaggy toward base. . . . . *Neritos*
15. Middle and hind tibiae with small spines on under side toward tips;  
 wings washed with metallic blue or green; tongue strong. . . 15½  
 Tibiae not spined; wings without extensive blue or green areas. . 16
- 15½. Hind wing with  $M_2$  and  $M_3$  stalked. . . . . *Diospage*  
 Hind wing with  $M_2$  and  $M_3$  connate. . . . . *Belemniastis*
16. Fore wing with  $R_2$  stalked on  $R_{3-5}$ . . . . . 17  
 Fore wing with  $R_2$  free or from accessory cell. . . . . 24  
 Fore wing with  $R_2$  stalked on  $R_1$ . . . . . 31
17. Tongue weak, palpi hardly exceeding front; hind tibiae with end  
 spurs only. . . . . *Ecpantheria*  
 Tongue strong, palpi fully developed; hind tibiae with all spurs. . 18
18. Base of abdomen shaggy. . . . . 19  
 Base of abdomen with at most a little loose hair each side of median  
 line. . . . . 21

<sup>1</sup> These have  $R_2$  stalked beyond  $R_5$ , — in *Amasia*, *Hyperandra* and some *Parevia* and *Argemolis*  $R_5$  is stalked beyond  $R_2$ .

19. Hind wing with  $M_2$  and  $M_3$  separate at origin.....20  
 Hind wing with  $M_2$  and  $M_3$  more or less stalked; wings rounded,  
 body smooth, pattern simple.....*Tricypha* (part)
20. Hind wing with all veins;  $M_3$  nearer to  $M_2$  than to  $Cu_1$  at origin.  
*Ammalo*  
 Hind wing with Sc or R lost;  $M_3$  and  $Cu_1$  approximate or stalked,  
 $M_2$  more widely separated; apex of fore wing of male frequently  
 turned under.....*Melese*
21. Palpus obliquely upturned, long enough nearly to reach vertex,  
 with third segment half as long as second.....*Metaxanthia*  
 Palpus with third segment shorter, less than  $1/3$  as long as second  
 when palpus exceeds middle of front.....22
22. Palpus short, not reaching middle of front.....23  
 Palpus moderate, slightly exceeding middle of front.....*Agoræa*
23. Palpus slender, third segment half as long as second....*Biturix*  
 Palpus stocky; third segment very small.....*Tanada*
24. Abdomen (and whole insect) closely scaled, slender; accessory  
 cell large and normal.....*Utetheisa*  
 Abdomen shaggy at base.....25
25. Hind wing with Sc absent, costal edge not lobed; pattern com-  
 plex.....*Ochrodota*  
 Hind wing with Sc distinct, or if lost (*Tricypha* occasionally)  
 with a distinct bend in front edge of cell where it was lost,  
 forming a slight costal lobe, and simple pattern of vague  
 shades only.....26
26. Palpi hardly exceeding front, tongue weak;  $R_2$  free.....*Apantes*  
 Palpi upturned to middle of front or longer, tongue strong....27
27. Fore wing with accessory cell.....28  
 Fore wing with  $R_2$  free.....29
28. Palpus with third segment long and porrect.....*Calidota*  
 Palpus simply upturned.....*Purius*
29. Palpi longer, the distance from tip of second segment to base of  
 antenna about  $1\frac{1}{2}$  times width of scape.....30  
 Palpi shorter, the distance between tip of second segment and  
 base of antenna more than twice width of scape....*Halysidota*
30. Pattern of fine striations; venation normal.....*Elysia*  
 Pattern of broad vague shades; male venation typically modified,  
 with  $M_1$  arising out of  $R_5$  near tip, and meeting  $M_2$  at margin,  
 $M_2$ - $Cu_2$  closely crowded, and  $M_3$  and  $Cu_1$  connate; Sc of hind  
 wing absent.....*Tricypha* ♂

31. Hind wing with Sc absent.....*Carathis*  
     Hind wing with all veins.....32
32. Hind wing with disc transparent and scaling blackish; pointed;  
     fore wing with simple diffuse banding.....*Baritius*  
     Hind wing pale or dull, evenly scaled, rarely pointed; fore wing  
     normally with complex pattern.....a few *Halysidota*

### Tribe PHEGOPTERINI

Larva with dense fine feathery hair, usually forming pencils, and felted with very little silk to make the cocoon; pupa with flattened body, bluntly rounded posterior end and no flange plates in front of abdominal spiracles; imago with prominent head and strong palpi and tongue. Sc of hind wing usually weakened at tip, occasionally lost.

This is a purely American group (except possibly *Rhodogastria*), richly developed in the Neotropical, where it forms almost the complete representation of the Arctiinae. In the North it is largely replaced by genera of Old World affinity, but still shows several common types. I divide it into four groups of genera, of which the first and last are strictly Neotropical and the last is aberrant, and should probably be transferred to the Euchromiidae.

### *Automolis* Group

Larva with meso- and metathorax each bearing a single large subdorsal wart (pupa not studied); imago with hind wing reduced in size and one medial lost; lateral lobe of metascutellum convex or bulging, in the *Neritos* group forming a cushion as wide as the hairy area of the scutum anterior to it.

### ROBINSONIA Grote

The genera of this group are closely related, and I am separating them on the characters used by Hampson. Probably study of the genitalic characters may produce a grouping more like that suggested by their patterns. The tympanal structures show that *Neritos* is a little separated, but the line of demarcation is still obscure. Larva of *R. dewitzi* on *Lucuma caimito*, tawny brown with dense feathery brown hair and black spotted head. (Ferr. d'Almeida 1929.)

1. Fore wing with only three large white areas along costal part of  
     wing and one small one at anal angle.....*deiopea*  
     Fore wing with five of the small areas along outer margin...*sanea*



## 1197 ROBINSONIA DEIOPEA Druce

*R. deiopea* Dr. Ann. Mag. Nat. Hist. (6) xvi, 37, 1895.

*Figured:* Biol. 77: 9; Seitz 44: d5.

Nov. 29 (Bts.). Guatemala to Colombia (Nat. Mus.).

## 1199 ROBINSONIA SANEAE Druce

*R. sanea* Dr. Ann. Mag. Nat. Hist. (6) xvi, 37, 1895.

*Figured:* Biol. 77: 3; Seitz 44: e7.

Oct. to Feb. (see diagram, p. 163). Costa Rica to Guiana.

IDALUS Walker (*Prumala* Schaus)

I should redefine this genus to include only the species with  $R_2$  stalked beyond  $R_5$  and the palpi upturned to the middle of the front — thus excluding *lineatus*. *Prumala* is supposed to have  $R$  and  $M_1$  of hind wing stalked instead of united; but this is generally merely a female character. Some species have hair on the tibiae but less than in *Castrica*. *I. hippia* should probably be transferred to *Eupseudosoma*, where it resembles the aberrant *marpessa* group.

1. Fore wing white with black pattern . . . . . *daga*  
     Fore wing with base gray ( $\sigma^7$ ) or mottled red, yellow and gray  
     ( $\varphi$ ), apical third yellow . . . . . *hippia*

## 1207 IDALUS HIPPIA Stoll

*Bombyx hippia* Stoll, Suppl. Cr. Pap. Exot. 57, 12: 8, 1790  $\sigma^7$ .

*Prumala pyrostrota* Dognin, Ann. Soc. Ent. Belge lii, 153, 1908.

Also *figured:* Seitz 45: d1, 2  $\sigma^7$  44: i7  $\varphi$  (as *pyrostrota*); Hamps. Suppl. 43: 25 (as *pyrostrota*).

A good series makes this synonymy reasonably certain. Hind wing with large sex patches in male as in some *Eupseudosoma*, and  $M_2$  sharply divergent from  $Cu_1$ , touching  $M_1$  at tip. Both sexes with  $Cu_1$  close to  $M_3$  in fore wing, and  $R$  and  $M_1$  of hind wing united.

Jan.-May (see diagram, p. 163). Lancetilla, Honduras (Bts.) to Guiana and Amazons.

## 1212.1 IDALUS DAGA DARES Druce

*I. dares* Dr. Ann. Mag. Nat. Hist. (6) xiii, 354, 1894.

*Figured:* Biol. 73: 23; Seitz 45: d8.

Body scarlet, orange in typical *daga*, from South America. Hind wing with Sc stalked in ♂, connate in ♀, and R and M<sub>1</sub> united in both sexes.

Nov. 28, Feb. to Apr., June 27. Lancetilla, Honduras (Bts.) to Colombia (Nat. Mus.).

#### PHÆOMOLIS Hampson

This genus is near *Amaxia* in structure and pattern. I believe *Eriostepta* is not distinct. Typically it has R and M<sub>1</sub>, M<sub>2</sub> and Cu<sub>1</sub> completely fused, but *P. beata* has them stalked in both sexes.

1. Female with the reddish area which extends from base to anal angle of solid color, except for a *costal* spot, male cut only with a yellow pm. bar; female hind wing blackish.....*beata*  
Both sexes with dark area interrupted more or less completely by yellow ante- and postmedial bands, which are more oblique and converge to inner margin, the ground gray; female hind wing red.....*lepida*

#### 1216a PHÆOMOLIS LEPIDA Schaus

*P. lepida* Schs. Ann. Mag. Nat. Hist. (8) ix, 38, 1912.

*Figured:* Hamps. Suppl. p. 26, fig. 9.

Sex patch moderate; male hind wing with Sc from end of cell; female with Sc, R and M<sub>1</sub> long-stalked.

July-Aug. (Fairchild), Dec. (Bts.). Costa Rica (type).

#### 1232c PHÆOMOLIS BEATA Dognin

*Eriostepta beata* Dgn. Ann. Soc. Ent. Belge liii, 219, 1909.

*Figured:* Hamps. Suppl. p. 65, fig. 16.

Both sexes with M<sub>2</sub> short-stalked and sharply divergent from Cu<sub>1</sub> (apparently overlooked by Hampson). Sex patch large, lower on the wing than figured by Hampson; Sc from middle of upper side of cell in male, from apex in female, which has R and M<sub>1</sub> very long-stalked.

Feb. 4, 26 (Bts., Fried.) Lancetilla, Honduras (Bts.) to French Guiana (type) and Peru (B.M.).

#### EUPSEUDOSOMA Grote

I transfer to this genus *Automolis aletis*, which agrees in both structure and appearance, and should probably add *Idalus hippia*, but the

latter is aberrant in appearance, though typical in structure. The white species are very close, and perhaps should be increased in number. Larva of *E. involutum* (Sepp) and *floridum* (Dyar) with yellow head and yellow to gray hair, the pencils white; on Eugenia and guava.

1. Outer third of fore wing pale yellow, contrasted with the reddish and gray base.....*Idalus hippia*  
Ground all white.....2
2. Fore wing with a median fascia composed of black streaks between the veins, and a subapical dot.....*aletis*  
Fore wing immaculate, or with black costal edge and two longitudinal gray or black lines only.....*aberrans*

#### 1229a EUPSEUDOSOMA ABERRANS Schaus

*E. aberrans* Schs. Proc. U. S. Nat. Mus. xxix, 211, 1906.

*Figured:* Rothschild, Nov. Zoöl. xvi, 4: 24; Seitz 50: a3.

The species of this group differ in the amount of pink; the present one having a mere trace or none on the neck, and none on the fore coxæ, but sometimes some on the male hind wing. *E. involutum* has pink coxal patches, *E. floridum* more pink on the neck, and frequently pink-shaded hind wings, and *E. agramma* lacks the male sex-patch. All the species come with or without the two dark lines on the fore wing.

Dominant in Feb. (see diagram, p. 163). Costa Rica to S. Brazil.

#### 1247a EUPSEUDOSOMA ALETIS Schaus

*Automolis aletis* Schs. Ann. Mag. Nat. Hist. (8) vi, 200, 1910.

*A. aletia* Schs. Proc. U. S. Nat. Mus. xxix, 214, 1905.

*Figured:* Hamps. Suppl. 45: 25 ♂, 26 ♀, 24 (♂ as *aleteria*); Seitz 50: i7 ♂, 8 ♀, 6 ♂ (as *aleteria*).

Male with sex patch as in the preceding. Pattern as in *Idalus hippia*, but with fewer black bars on fore wing and some pink on hind wing.

Jan. 28 (Bts.). Costa Rica to Guiana and Upper Amazons.

#### PREMOLIS Hampson

Identical with *Eupseudosoma* except for the longer palpi. The following species has the essential pattern of the *marpessa* group, and is even closer to *Hyperandra appendiculata*, but shows the structural characters of *Premolis*.

## PREMOLIS EXCAVATA, new species

Palpi upturned (in front view) to the level of the vertex, third joint short; antennæ subserrate. Fore wing with outer margin much longer than inner;  $R_2$  short stalked on  $R_{3-5}$ ,  $M_1$  nearly connate;  $Cu_1$  from very close to  $M_3$ . Hind wing with Sc arising from before middle of cell, R and  $M_1$  united, ending abruptly at outer edge of stigma and not reaching margin of wing;  $M_2$  and  $Cu_1$  connate,  $M_2$  and  $M_3$  separating in the specimen at hand in a minute fork just before margin. Sex patches enormous, on the fore wing extending up into cell and over  $Cu_2$ , and surrounded by a glossy stripe; in the hind wing covering all the wing except the margins and anal lobe. Anal lobe truncate, much shorter than greatest length of wing, which forms a broad lobe on  $M_2$ - $Cu_1$ .

Head brown, including antennæ and most of palpi; front and first segment of palpi cream; vertex bright yellow. Thorax with anterior third pure white, the boundary cutting squarely across disc and tegulae; disc otherwise yellow, with anterior and posterior pairs of blackish spots; tegulae, except in front, and scutellum light brown-gray. Abdomen yellow, with whitish tail. Under side yellowish white, the fore and middle legs tinted with pale gray-brown. Fore wing pale brown-gray, with pale veins, and broader pale streaks on middle of cell and fold, the Sc streak also widened and ending abruptly without touching margin. Outer margin with a light yellow patch, starting abruptly at  $M_1$  and tapering regularly to a point on margin at fold. Hind wing pale yellow. Under side pale yellow with a squarish apical patch of pale brown-gray. 30 mm.

Barro Colorado Id., C.Z., Panama, Jan. 26, 1935 (Bates); unique male type in M. C. Z.

The nearest species is *Hyperandra appendiculata*, which has a much larger anal lobe,  $M_1$  and  $M_2$  both stalked, and the marginal yellow area tapering off to the apex. In all the Premolas the marginal area is much larger, extending in about to end of cell. If the minute tip of  $M_3$  is considered normal the species will key to *Tricypha* in the present paper, to *Bertholdia* in Hampson. The former has ample hind wings and a normal, grooved lateral lobe of the metascutellum, the latter has  $M_3$  and  $Cu_1$  stalked instead of  $M_2$  and  $M_3$ .

NERITOS Walker (*Paranerita*, *Hypouerita* Hampson)

This little group is distinguished by the much enlarged bulla over the tympanum (formed by the lateral extension of the metascutellum).

Hampson has failed to see the accessory cell in *N. repanda*, the genotype, and proposed the names *Paranerita* and *Hyponerita* for species in which he did see it. In fact all the specimens examined have it.  $R_1$  may arise free or from the anterior side of the acc. cell, sometimes varying in the same species, but it is from the acc. cell in all the specimens examined of *N. repanda* and *metaleuca*, and free in *N. cotes*.

1. Abdomen deep yellow above.....*cotes*  
 Abdomen scarlet above.....*metaleuca*

#### 1544a NERITOS METALEUCA Dognin

*N. metaleuca* Dgn. Het. Nouv. Am. Sud. iii, 13, 1911.

*Figured:* Hamps. Suppl. 45: 8; Seitz 46: d6 (both of ♂).

Very close to *N. repanda*, distinguished by the small middorsal yellow spot or bar on first segment of abdomen, and complete absence of yellow or red antemedial markings on fore wing. Male with a rounded subapical patch separate from the dark basal half, female with the two connected by a gray bridge, leaving costal and anal pale yellow patches.

Jan., June (Fried.) all ♀, described from a Venezuela ♂. The Cornell coll. has a ♂ without locality, but associated with Central American material.

#### 1549 NERITOS COTES Druce

*N. cotes* Dr. Ann. Mag. Nat. Hist. (6) xviii, 38, 1896.

*Figured:* Biol. 73: 24 ♂; Seitz 46: f1, 2 ♀.

The apical patch and dark base may be either separate or connected in male, usually at least connected in female. This species has the vertex with a large yellow spot, some blackish marginal shading on hind wing below, and costal edge of fore wing red, at least toward tip. *N. tipolis* has no red on costal edge, and no black on hind wing below; *N. samos* Dr. is much more red, with the vertex mostly red.

Chief flight in Feb.-Apr. (see diagram, p. 163). Ranges north to Guatemala and south at least to Colombia.

#### NEONERITA Hampson

Similar to *Neritos*. First segment of abdomen with a massive white dorsal tuft, second with a slightly raised white spot. Fore wing with  $R_2$  stalked on  $R_{3-5}$ ,  $M_3$  and  $Cu_1$  stalked.

## 1244 NEONERITA DORSIPUNCTA Hampson

*N. dorsipuncta* Hmps. Cat. Lep. Phal. iii, 37, fig. 30, 1901.

Also figured: Seitz 45: h3.

Fore wing transparent yellow, basal half and apical patch light buff, mottled with pink and brown, hind wing pink; abdomen scarlet and pink.

Feb. 26 (A.M.N.H.). Mexico to Brazil.

## PAREVIA Hampson

The following species is aberrant in having  $R_1$  free, — it would run to *Neritos* in Hampson's key, but differs in the absence of acc. cell and completely smooth abdomen.

1. Fore wing with marginal yellow patches.....*parnelli*  
Fore wing immaculate gray.....*griseotincta*

## 1246g, 1246h PAREVIA GRISEOTINCTA Rothschild

*Neritos griseotincta* Roth. Nov. Zoöl. xvi, 291, 1909, ♀.

*Neritos affinis* Roth. Nov. Zoöl. xvi, 292, 1909, ♂.

*Nezula grisea* Dyar, Proc. U. S. Nat. Mus. xlvii, 173, 1914 (not Schaus).

Figured: Hamps. Suppl. p. 121, fig. 48 ♂ (as *affinis*), 45: 20 ♀; Seitz 46: k5 ♂ (as *affinis*), 6 ♀.

Male with abdomen slender, pink with gray penultimate and whitish last segment; and hind wing pink below costa; female with hind wing and abdomen concolorous mouse gray; both sexes with deep yellow head. The male has loose sex-hair on hind tibiae. The true *N. grisea* has a more hairy abdomen and dark hind wing in both sexes, also has lost the upper tibial spurs.

Nov., Feb. (Bts.), Jan. (Fried.), Feb., Mar. (A.M.N.H.). Venezuela, Surinam and Amazons.

Dyar reports *P. parnelli* Schaus (Hamps. Suppl. 45: 18) from the Zone.

## GLAUCOSTOLA Hampson

Very close to *Neritos* and *Parevia*, differing in the connate  $M_3$  and  $Cu_1$  of hind wing. Acc. cell present or absent; abdomen scaled, or lightly hairy, as in *N. repanda* female.

1. Fore wing gray with a white spot.....*guttipalpis*  
Fore wing with yellow spots and black lines.....*reimona*

## 1343 GLAUCOSTOLA GUTTIPALPIS Walker

*Leucopsumis guttipalpis* Wlk., List Lep. Ins. Br. Mus. vii, 1649, 1856.

*G. underwoodi* Roth. Nov. Zoöl. xvii, 187, 14: 3, 1910.

Figured: Hamps. fig. 63; Seitz 42: f2, 1 (*underwoodi*).

This is the genotype, and has  $R_2$  free. Head yellow, hind wing black with a white dash. The following specimen will be *G.g. underwoodi*, with the dash on the hind wing less than  $\frac{1}{4}$  the width of the wing. Type *G. guttipalpis* is from Brazil.

Oct. 31 (Bts.). Costa Rica to Brazil.

## GLAUCOSTOLA REIMONA Schaus

*G. reimona* Schs. Ann. Mag. Nat. Hist. (10) xi, 571, 1933.

The abdomen and hind wings are solid yellow. Hind wing with R and  $M_1$  stalked.

Feb. 24, Mar. 15, 17, 20 (A.M.N.H.), Apr. 4 (Friedman). Described from Colombia.

## AUTOMOLIS Hübner

A large and varied genus, — of about 180 species, all strictly Neotropical. Many more species will certainly be taken on the island. Secondary sexual structures and patterns are extremely varied, and the genus is probably not homogeneous, being accepted here as defined by Hampson. The few known larvæ are varied (see Seitz under *A. sypilus* and *sanguinolenta* Cr.).

*Synopsis of species-groups, after Hampson*

SECT. I: Hind wing of male with costa highly lobed, a sex-patch on upper side below costa

A. Hind wing with  $Cu_1$  from or from near angle of cell;  $M_2$  from above angle; ♂ with R and  $M_1$  coincident, and Sc from middle of cell; ♀ with Sc and R stalked

a. Male antennæ bipectinated . . . . . *critheis*

b. Male antennæ serrate and fasciculate. Fore wing of male without glandular swelling on costa and hind wing without long hair on costa

a<sub>2</sub> Hind wing with large anal lobe and pencil . . . *reducta*

b<sub>2</sub> Hind wing not modified dorsally . . . . . *lineatus*



- B. Hind wing of male with  $Cu_1$  from angle of cell, R and  $M_1$  stalked; male antennæ minutely serrate and fasciculate; fore wing with sex patch below middle on under side.

*obscurata*

SECT. II: Hind wing of male not lobed and without sexual patch

- A. Male antennæ bipectinate, with short branches; hind wing of male with Sc and R stalked, anal angle not lobed. . . *metallica*

- B. Male antennæ serrate and fasciculate. Hind wing of male with Sc from cell, the anal angle not lobed

- $a_2$  Palpi with third joint long and close-scaled; fore wing  $R_2$  long-stalked, hind wing of male with R and  $M_1$  stalked (*Ischnognatha*) . . . . . *vitrea*

- $b_2$  Palpi with third joint short

- $a_3$  Hind wing of male with R and  $M_1$  coincident.

*lineosa, sicilia*

- $b_3$  Hind wing of male with R and  $M_1$  stalked.

*diluta, rutila*

*Key to Species*

1. Body spotted with metallic blue . . . . . 2  
Body without metallic markings . . . . . 3
2. Wings and disc of thorax yellow or orange; fore wing with black and white apical spot; body with orange on one or two basal segments . . . . . *sicilia*  
Wings and disc of thorax blackish; fore wing with a yellow longitudinal stripe narrowed or interrupted beyond cell and pale veins . . . . . *metallica*
3. Fore wing with fine black lines midway between veins; body red to yellow . . . . . 4  
Fore wing without fine longitudinal black lines . . . . . 6
4. Body yellow . . . . . 5  
Body red. Wing striate on a buff ground, the apical part not contrasting with the rest . . . . . *lineosa*
5. Outer half of wing translucent white, with subterminal black dots . . . . . *vitrea*  
Outer half of wing striped like base, on a yellowish ground. *lineata*
6. Body blackish, fore wing with black base . . . . . 7  
Body red; ground light . . . . . 8  
Body buff; fore wing yellow with two gray bands . . . . . *reducta*

7. Fore wing with a transverse black median stripe, cut by the fine white veins.....*critheis*  
 Fore wing with base brown, apical part light yellow with dark subterminal spots, the yellow more extensive in the ♂. *obscurata*
8. Fore wing with black basal patch and a yellow costal stripe from the end of this patch to apex; abdomen almost wholly blackish.  
*diluta*  
 Fore wing with ground blackish, finely veined with yellow; a yellow postmedial fascia and yellow side patches on abdomen.  
*rutila*

## 1250 AUTOMOLIS REDUCTA Walker

*A. reducta* Wlk. List Lep. Ins. Br. Mus. vii, 1638, 1856.

*Cretonotus lobifer* H.-S. Aussereur. Schm. 84, fig. 503, 1856.

Also figured: Hamps. fig. 35; Seitz 52: e1.

Pale yellow; fore wing with light gray fascia on basal half of costa, and a more diffuse one from middle of inner margin to apex; hind wing of male with deep anal lobe and hair-tuft.

Mar. 8 (A.M.N.H.). Costa Rica to southern Brazil.

## 1247 AUTOMOLIS CRITHEIS Druce

*A. critheis* Dr. Biol. Centr. Am. Het. i, 89, 9: 19, ♀, 1884.

Also figured: Seitz 50: k7 ♀.

In the male the hind wing is relatively smaller, and the yellow median area stops below the cell, leaving the dorso-median area white. In the closely related *A. herois*, which ranges from Mexico to Brazil, the male antennæ are serrate, and the black bars on the fore wing are broader and less intense.

General (see diagram, p. 163), Mar. 26 (Bradley-Cornell). Ranges to Surinam and S. Brazil.

## AUTOMOLIS OBSCURATA Schaus

*A. obscurata* Schs. Proc. U. S. Nat. Mus. lvii, 116, 1920 (*obscurata* Seitz 52: f7 is not this species).

In the male the dark base of the fore wing is cut off at about  $\frac{2}{3}$  by a moderately waved boundary, the apical area has a couple of pm. and fairly complete series of terminal spots and the hind wing is pale. In the female the brown area is much darker and more extensive,

covering all but the most apical of the st. spots, and the hind wing is dark gray. Palpi white.

In the closely related *A. sanguistrigata* Dgn. (♀ *submarginalis* Schs.) from South America the effect is duller, the red stripe on the tegulae evanescent, the female hind wing pale and the palpus crimson. (Seitz 52: f6 ♂, g1 ♀ as *submarginalis*).

Flight scattering (see diagram, p. 163). Guatemala (type).

#### 1258d AUTOMOLIS METALLICA Joicey

*A. metallica* Jcy. Ann. Mag. Nat. Hist. (8) xviii, 57, 14: 7, 1916.

Also figured: Seitz 50: c2 ♂.

In this species the pale veins are distinct and the orange streak varies extremely but is always narrowed or interrupted and may be reduced to a wedge below the cell and a subapical spot. In *A. guapisa* Schs. the stripe is even and the veins fainter; in *A. taniata* the fascia is continuous, broad, fairly even and pale yellow, and the veins are not pale at all. In this species the fore tibiae and tarsi and mid and hind tarsi are yellow, contrasting, in *A. rosenbergi* they are blackish with yellow streaks only.

Oct. 29-Mar. 22. Lancetilla, Honduras (Bates). Described from Chiriqui.

#### 1289 AUTOMOLIS VITREA OCCIDENTALIS Roth.

[*Bombyx vitrea* Stoll, in Cr. Pap. Exot. iii, 151, 276: C, 1780.]

*A. vitrea, occidentalis* Roth. Nov. Zoöl. xvi, 47, 7: 4, 1909.

Also figured: Seitz 52: g5 (type form), h1 (*v. borealis*), h2 (*v. meridionalis*).

The type form is from Surinam, *borealis* from Central America, *meridionalis* from Paraguay; the Barro Colorado specimens come nearest the Peruvian *v. occidentalis*, the ground being redder and black lines finer than in *borealis*, which is in the present collection from Honduras.

Dec. (Bts.).

#### 1290 AUTOMOLIS LINEOSA Walker

*Idalus lineosa* Wlk. Char. Lep. Het. 10, 1869.

Figured: Hamps. 36: 4; Seitz 52: d1.

Dec. (Bts.), Guatemala (Bequaert) to Colombia, the race *sublineata* Roth. (Seitz 52: d2) in Peru.

## 1206, 1290a AUTOMOLIS LINEATUS Druce

*Erius lineatus* Dr. Biol. Centr. Am. Het. i, 89, 9: 17, ♂, 1884.

*Automolis internervosa* Dgn. Het. Nouv. Am. Sud v, 10, 1912 ♀.

Also figured: Hamps. Suppl. 46: 25 ♀; Seitz 45: d3 ♂, c7 ♀ (as *internervosa*).

Venation and palpi normal for *Automolis*. Male with very large sex patch on hind wing and pencil on under side of fore wing, more as is normal in *Neritos*.

Oct., Dec., Feb. (Bts.). Guatemala to Venezuela.

## 1294 AUTOMOLIS SICILIA Druce

*A. sicilia* Dr. Biol. Centr. Am. Het. i, 75, 1884.

Figured: Biol. 72: 17 (as *parma* Schs.); Seitz 50: f7.

The outer edge is very narrowly edged with black, but broadly in *contraria*, the only other species with the black and white apical spot.

Nov. 29-Feb. 1 (see diagram, p. 163). Ranges north to Mexico.

## 1301 AUTOMOLIS DILUTA Felder

*Cratoplastis diluta* Fld. Reise Novara Lep. 102: 8, 1874.

Also figured: Seitz 52: c1.

The single diffuse yellow costal stripe from near base to apex is distinctive.

Oct. 29-Feb., Mar. 11, 18, May 30, June 4 (Bts. and Fried.). Mexico to Para, Amazons. Represented in southern Brazil by the species or subspecies *catherinæ*, which has the gray area darker and more extensive.

## 1303 AUTOMOLIS RUTILA Stoll

*Sphinx rutilus* Stoll in Cr. Pap. Exot. iv, 183, 382: B, 1781.

*Ischnognatha striata* Druce, Ann. Mag. Nat. Hist. (6) xv, 45, 1895.

The yellow postmedial fascia is of moderate width, in the closely related *A. godmani* Dr. (Biol. 9: 1) it is broadened almost to the apex.

Jan. 26, Feb. 9, Apr. 10, May 24. Described from Surinam (*rutila*) and Costa Rica (*striata*).

## CASTRICA Schaus

R<sub>2</sub> long stalked; M<sub>2</sub> and Cu<sub>1</sub> of hind wing strongly stalked; hind tibiae with long loose hair. The pattern of olive gray and light yellow is distinctive and the few nominal species are perhaps really races.

## 1308 CASTRICA PHALÆNOIDES Drury

*Sphinx phalænoides* Dru. Ill. Exot. Ent. ii, 28: 6, 1773.

*Castrica oweni* Schaus, Jour. N. Y. Ent. Soc. iv, 136, 1896, ♀.

Also figured: Hamps. fig. 51; Seitz 53: b6 ♂, 7 ♀; Biol. 74: 13.

The South American *C. sordidior* is probably merely a race with darker male hind wing, but the ranges overlap.

Dec. 29 (Bts.). Guatemala to Guiana and Bolivia (*sordidior*).

*Halysidota* Group

Meso- and metathorax of larva each with two subdorsal warts; the feathery hair usually forming both massive tufts and pencils (no pencils in *Calidota*). The few known pupæ highly glossy, in cocoons composed almost wholly of felted hairs, the short hairs inserted endwise. Imago with hind wing almost always ample and normally fully veined; side lobes of metascutellum very narrow and strongly concave; abdomen with shaggy dorsal hair. Larvæ so far as known general feeders, most typically on trees.

## MELESE Walker

This genus, with the closely related *Bertholdia* and *Cissura*, is transitional to the preceding, with reduced hind wing and normally with a gland below cell in male. About half the species have the apex of the male fore wing turned down at right angles or folded under, and colored more like the under sides. These males are relatively rare in collections, and have perhaps often been discarded as damaged specimens.

1. Fore wing with a translucent subterminal costal bar; male with apex folded under.....*asana*

Fore wing with outer border yellow at least, the male more extensively yellow; female with a separate spot just beyond cell.

*laodamia*

Fore wing without conspicuous yellow markings.....*incerta*

## 1317 MELESE INCERTA Walker

*Malabus incertus* Wlk. List Lep. Ins. Br. Mus. iii, 716, 1855.

Figured: Hamps. 37: 6; Seitz 43: k1 (poor and doubtful).

Fore wing with outer margin concave, edged with pink; hind wing with  $M_3$  and  $Cu_1$  stalked.

Chief flight in Dec. (see diagram, p. 163). Ranges south to Brazil.

## 1320 MELESE ASANA Druce

*Neritos asana* Dr. Biol. Centr. Am. Het. i, 90, 9: 21, 1884.

Also figured: Seitz 43: k4 ♂, 5 ♀; Hamps. fig. 57.

The folded outer margin of male is not shown in Hampson's figure 57. Outer margin of female convex,  $M_3$  and  $Cu_1$  of hind wing connate. Subapical spot much larger in female.

Chiefly Dec.-Jan. (see diagram). Mexico to south Brazil, the latter form being a slight race (*albogrisea* Roth.). The lot includes only 1 male to 12 females.

## 1322 MELESE LAODAMIA Druce

*Neritos laodamia* Dr. Biol. Centr. Am. Het. i, 90, 9: 20 ♂, 1884.

*Neritos cutheans* Dr. Ann. Mag. Nat. Hist. (6) xviii, 40 ♀, 1896.

Also figured: Seitz 43: f5 ♂, 6 ♀.

Apex not folded;  $M_3$  and  $Cu_1$  connate or slightly separated. The complex male pattern begins to be suggestive of *Amaxia*, the female of *Neritos*. One of the two males from Honduras is slightly suffused.

Nov.-Feb. (Bts.), Mar. 11 (A.M.N.H.), July-Aug. (Fairchild). Lancetilla, Honduras (Bts.), August. Mexico to Trinidad.

## AMMALO Walker

I am restricting Ammalo to the typical group, which differs from *Halysidota* only in the stalked  $R_2$ . Antennal pectinations with a few fugitive scales; heavily bristled. The caterpillar is presumably a general feeder, like *Halysidota*.

## 1337 AMMALO HELOPS Cramer

*Bombyx helops* Cr. Pap. Exot. i, 72, 72: C, 1775.

*Halesidota megapyrrha* Walker, List Lep. Ins. Br. Mus. xxxi, 308, 1864.

Also figured: Hamps. fig. 61; Seitz 53: h4 (typical) h5 (var. *megapyrrha*).

Larva: Dyar, Proc. Ent. Soc. Wash. xiii, 229, 1911; Hamps. Suppl. 194, 1920; Seitz p. 385.

Body orange with black spots, hind wing orange, fore wing with vague striation in two shades of brown, and some orange spots, in var. *megapyrrha* confined to the base.

July-Aug. (Fairchild). Mexico to Brazil.

Larva reddish or brownish, with short tufts of black hair.

BARITIUS Walker (*Pachydota* Hampson)

This genus differs from those species of *Ilalysidota* that have  $R_1$  and  $R_2$  stalked, only in habitus. The two names are separated in Hampson's key by the (barely) separate or stalked  $M_1$  of fore wing. In fact  $M_1$  is frequently connate in both (as noted in Hampson's own descriptions) and there is no difference except in habitus.

1. Abdomen black with red terminal segments. . . . . *hæmorrhoides*  
     Abdomen with brown base, extended in middorsal area, and black  
     segmental lines. . . . . 2
2. Abdomen yellow. . . . . *punctata*  
     Abdomen vermilion. . . . . *superba*

## 1365 BARITIUS SUPERBA Schaus

*Aclytia superba* Schs. Ent. Am. v, 89, 1889.

*Figured:* Biol. 73: 19; Seitz 42: g1.

The vague dark transverse bands are irregular and anastomose near the middle of the wing; top of head dark; abdomen more red than *B. punctata*.

Feb. 12 (A.M.N.H.). Mexico to Peru.

## 1353 BARITIUS PUNCTATA Rothschild

*Baritius punctata* Roth. Nov. Zoöl. xvi, 274, 1909.

*Baritius albiceps* Hamps. Cat. Lep. Phal. iii, 94, 1901 (in part, not Wlk.).

*Pseudapistosia saduca* Dr. Biol. Centr. Am. Lep. ii, 381 (in part), 76: 1.

Also *figured:* Seitz 55: k5 (k6 shows the black tail and so is presumably *B. albiceps*).

Fore wing with four or five subparallel dark bands; abdomen blackish at base, but yellow at apex. In *B. sadima* the base of the abdomen is yellow, in *B. albiceps* the apex is black.

Feb. 8 (A.M.N.H.), July-Aug. (Fairchild). Honduras to Surinam at least.

## 1364b BARITIUS HÆMORRHOIDES Schaus

*B. hæmorrhoides* Schs. Proc. U. S. Nat. Mus. xxix, 223, 1905.

*Figured:* Hamps. Suppl. 49: 2; Seitz 42: f7.

Fore wing with dark base, border and one band only. Male with a



pad of yellow hair at base of abdomen below. The closely related *B. pyrrhopyga* from Brazil has the thorax and male coxae red.

Nov. to June (see diagram, p. 163). Described from French Guiana.

### CARATHIS Grote

Similar to *Halysidota* in structure and pattern, Sc of hind wing lost; hind wing with  $M_3$  and  $Cu_1$  stalked (not  $M_2$  and  $M_3$  as usual in *Halysidota*). The following species stands as a *Baritius* in Hampson but has both the structure and pattern of *Carathis*.

#### 1368 CARATHIS ELEUTHERA Stoll

*Bombyx eleuthera* Stoll in Cr. Pap. Exot. iv, 159, 371: A. 1781.

Also figured: Seitz 42: h2 (unrecognizable).

Fore wing light buff with confused series of dark-ringed spots as in many *Halysidotas*. Hind wing pale yellow tinged with pink, shorter than in most *Halysidotas*.

Nov. 22-Feb. 24 (Bts.). Surinam, Ecuador, Bolivia.

### OCHRODOTA Hampson

Like *Carathis*, but with  $R_1$  and  $R_2$  free. Pattern essentially as in *Carathis*, but suffused with brown, leaving relatively small areas with the ocellate pattern on buff. Specimens with the essential pattern of *pronapides* range from Guatemala to S. Brazil, and stand under various (too many) names.

#### 1347 OCHRODOTA PRONAPIDES Druce

*Zatrephes pronapides* Dr. Ann. Mag, Nat. Hist. (6) xiii, 173, 1894.

Figured: Biol. 74: 3; Hamps. fig. 66; Seitz 43: a7.

Hind wing almost pure yellow, abdomen yellow with a few paired black spots.

Jan. to Mar.; July-Aug. The type was also from Panama.

### TRICYPHA Möschler

Male with venation more or less modified; female with  $R_2$  stalked,  $M_2$  and  $M_3$  short-stalked; both with Sc of hind wing lost. The genus is a slight variant of *Pelochyta*, and has the same pattern.

## 1369 TRICYPHA IMPERIALIS Heylæerts

*Romanoffia imperialis* Heyl. Comptes-R. Soc. Ent. Belge xxviii, p. xcv, 1884.

*Figured:* Rom. Mem. ii, 9: 1; Seitz 42: i2 (♂).

Male with  $R_2$  from apex of cell,  $M_1$  bent to form almost a quadrant, giving rise to stalk of  $R_{3+4}$  and  $R_5$  from its upper side and joining  $M_2$  at tip.  $M_2$ - $Cu_2$  closely crowded;  $M_3$  and  $Cu_1$  short-stalked. Female with  $R_2$  normally stalked,  $M_2$  and  $M_3$  stalked in both wings. Dull gray with three more or less distinct darker transverse bands, interrupted by the modified areas in the male; coxæ yellow with black spots, abdomen yellow, the upper side almost covered with a brown patch.

The series contains only 1 ♀ to 21 ♂s.

Nov.-Feb. (see diagram, p. 163). Lancetilla, Honduras, Apr. (Bts.). Mexico to Amazons and Bolivia.

## PELOCHYTA Hübner

Similar to *Halysidota*, more slender; palpus longer, upturned well beyond middle of front, third segment about half as long as second; fore wing with  $M_3$  and  $Cu_1$  about  $\frac{1}{4}$  as far apart at origin as  $Cu_1$  and  $Cu_2$ . Wings without pattern.

## 1373a PELOCHYTA MISERA Schaus

*P. misera* Schs. Ann. Mag. Nat. Hist. (8) vii, 184, 1911.

*Figured:* Hamps. Suppl. 49: 11; Seitz 55: a3.

Both wings alike, dark fuscous with a purplish gloss; head, collar and under side of body yellow. Male (type only seen) smaller and darker.

Jan. 30 (Bts.). Types from Costa Rica.

## ELYSIUS Walker

Similar to *Halysidota* except for the longer palpi. The fore wing is covered with more or less obvious very fine striation or flecking, unlike *Tricypa*, which may perhaps show the same venation at times.

1. Fore wing with areas of yellow, striated with red. . . . . *conspersa*  
Fore wing dull fuscous, with faint luteous striation. . . . . *disciplaga*

## 1385 ELYSIUS CONSPERSA Walker

*E. conspersus* Wlk. List Lep. Ins. Br. Mus. iii, 714, 1855.

*Figured:* Biol. 9: 25; Seitz 54: c2.

Head, thorax and shaggy hair orange, abdomen striped black and yellow; fore wing with three separate yellow and orange patches.

Dec. 27 (Bts.). Panama to So. Brazil.

## 1393 ELYSIUS DISCIPLAGA Walker

*Halesidota disciplaga* Wlk. List Lep. Ins. Br. Mus. vii, 1709, 1856.

*Figured:* Hamps. 38: 15; Seitz 54: d6.

Dull brown, including head; abdomen yellow with a large mid-dorsal brown patch; hind wing pale. Hampson mentions black lateral spots and a basal spot which these specimens lack.

Nov. 10 (Bts.), Feb. 15 (Fried.). Mexico to Bolivia.

## THALESA Schaus

Very close to *Halysidota*, with the exact pattern of the *catenulata* group. Hind wing with one dorsal vein lost, Sc obsolescent; inner margin of fore wing expanded, strikingly so in male.

## 1472 THALESA CITRINA Sepp

*Phalæna citrina* Sepp, Ins. Surinam, 113, 53, 1848.

Also *figured:* Hamps. fig. 89; Seitz 57: f6 (normal), 7 (dwarf race *parva* Roth.).

*Early stages:* Sepp, l.c.

Male easily distinguished from the *catenulata* group by the broad brown inner marginal stripe; female with discal spot deeply marked or possibly ocellate. The closely related *T. texta* has a black discal bar, and *T. debilis* Schs. is paler and has no silver dot.

July-Aug. (Fairchild), Feb. (Bts.), Feb. 24, Mar. 2 (Fried.), 13 (A.M.N.H.), Nov. 15 (Bts., — the only male in the lot). Widely distributed.

Larva apparently variegated, with series of truncate grayish dorsal and lateral tufts, and long white hair at both ends; on Inga.

## HALYSIDOTA Hübner

Palpi upturned to middle of front (longer in *maroniensis*) with third segment short. Base of abdomen shaggy. Fore wing with R<sub>2</sub>

free, rarely shortly stalked with  $R_1$  or  $R_{3-5}$ ,  $M_3$  and  $Cu_1$  half as far apart at base as at margin, and more than  $1/3$  as far apart as  $Cu_1$  and  $Cu_2$  at origin (except *sobrina*). Hind wing with Sc not reaching margin,  $M_2$  and  $M_3$  connate or stalked.

Larva with dense fine feathery hair, often covering body, with a series of fine short dorsal pencils, and long pencils at both ends. Food of trees and shrubs (*cinctipes* group) or grasses (*longa* group). Pupa highly glossy, the short hairs worked perpendicularly through the meshes of the cocoon.

The genus is large, varied, and full of close species. It will not be fully understood until the genitalic characters have been worked out, and far more larvæ known. I follow the original spelling of the name, justified by the Greek equivalent. The spelling with *i* was based on a misprint, which was taken up in indexing; *e* was a further mistake of Walker's.

1. Fore wing with light olive veins on a cream ground only.

*iridescens*

Fore wing with transverse markings or ocelli.....2

2. Fore wing with about 25 red-centered yellow ocelli.....*grandis*

Fore wing not marked with red.....3

3. Fore wings with smooth-tinted darker transverse bands, finely edged with black.....*interlineata*

Fore wing without black-edged bands, the black when present in the form of lunules or dusting.....4

4. Fore wing with a more or less distinct dark oblique shade extending from lower angle of cell to apex, or part of that distance...5

Fore wing without an oblique subapical shade.....7

5. Fore wing with  $R_2$  stalked on  $R_{3-5}$ ; apical shade strong at end of cell, fading out or lost toward apex.....*strigulosa*

Fore wing with  $R_2$  free; apical shade strongest toward apex...6

6. A conspicuous black spot at lower angle of cell; ground deeper yellow.....*tabernilla*

No special spot at lower angle of cell, the discal spot as high as cell and of the same light brown as the other markings as a rule; ground paler straw, with fine yellow-brown markings...*angulata*

7. Inner margin of fore wing edged with dark brown as in *Thalesa*, either finely or somewhat suffused up.....8

Inner margin of fore wing pale, concolorous.....9

8. Discal spot inconspicuous, incorporated in the contrasting brown postmedial shade; ground darker.....*catenulata*

Discal spot contrasting, white, outlined with brown, the inner side of the annulation continued as a black bar to upper angle of cell; larger and paler. . . . . *annulosa*

9. Male with sex-scaling on cell below; fore wing deeper ochre with very irregular umber brown flecking, gathering in patches at end of cell and antemedially at costa. . . . . *sobrina*

No sex-scaling; male antennæ very large; fore wing pale, with numerous rather evenly darker lunulate lines and a white-centered but somewhat imperfect ocellus at lower angle of cell.

*maroniensis*

#### 1486b HALYSIDOTA MARONIENSIS Schaus

*H. maroniensis* Schs. Proc. U. S. Nat. Mus. xxix, 223, 1905.

*Figured:* Hamps. Suppl. 54: 3; Seitz 57: h6.

Male easily recognized by the enormous antennæ; female almost exactly like *H. thyophora*, perhaps separable by the stronger spots on the legs. The fore legs have two subapical spots, often enclosing a paler spot, and more or less traces of basal ones, the mid-legs with 2 or 3 small brown spots, the hind legs with one. This will distinguish the species from most of the similar ones.

Flight scattering (see diagram, p. 163). Lancetilla, Honduras, Apr. (Bts.). Guiana and Amazons, the southern range uncertain through confusion with *H. thyophora*.

#### 1493 HALYSIDOTA SOBRINA Möschler

*H. sobrina* Msch. Verh. z.-b. Ges. Wien xxvii, 668, 9: 32, 1877.

Also *figured:* Seitz 57: h7; Hamps. fig. 91.

Female similar to male, but without the sex-scaling. Each tibia with median and terminal black spots.

Chief flight at end of Jan. (see diagram). Lancetilla, Honduras (Bts.) to Bolivia.

#### 1496 HALYSIDOTA INTERLINEATA Walker

*H. interlineata* Wlk. List Lep. Ins. Br. Mus. iii, 739, 1855.

*H. i. intensa* Roth. Nov. Zoöl. xvi, 283, 1909.

*Figured:* Nov. Zoöl. xvii, 11: 19 ♂, 20 ♀ (*interlineata*), 21, 22 (*intensa*); Seitz 59: e1 (*interlineata*), 2 (*intensa*).

Subterminal band absent, except at the margins (typical) or present, but without spots in cells  $R_4$  and  $Cu_1$  (*intensa*). In the closely related *H. underwoodi* the band is complete.

Feb. (Bts. — typical), June (Fried. — *intensa*). Mexico to Bolivia.

#### 1500c HALYSIDOTA GRANDIS Rothschild

*H. grandis*, Roth., Nov. Zoöl. xvi, 275, 1909.

*Figured*: Hamps. Suppl. 54: 13; Seitz 57: i3.

Probably a form of *H. cyclozonata*, also described from the Amazon basin. Fore wing with  $M_3$  and  $Cu_1$  strongly divergent; hind wing with  $Cu_1$  practically from angle of cell,  $M_2$  and  $M_3$  stalked. In Hampson's key this species would run to *Hyperthema*, and the brilliant coloring suggests there may really be a connection. The females average less red than the males.

Principal flight in Dec. (see diagram, p. 163). Lancetilla, Honduras (Bts.) to Brazil.

#### 1506d HALYSIDOTA ANGULATA Rothschild

*H. angulata* Roth., Nov. Zoöl. xvii, 65, 1910.

*Figured*: Hamps. Suppl. 54: 21; Seitz 58: a5.

Straw color, the fore wing with light brown lunules almost reduced to flecks, a brown spot in cell near end, and a dark streak from lower angle of cell to apex, most distinct toward apex. Legs pale, with a little infuscation of fore tibia and tips of tarsi only.

Nov. 26 (Bts.) July-Aug. (Fairchild, a doubtful female). Described from Peru.

#### HALYSIDOTA TABERNILLA Schaus

*H. tabernilla* Schs. Ann. Mag. Nat. Hist. (10) xi, 581, 1933.

All the markings are faint except the black discal spot.

Jan. 27, ♀ (Bts.). Male type also from Panama.

#### 1516 HALYSIDOTA ANNULOSA Walker

*H. annulosa* Wlk. List Lep. Ins. Br. Mus. iii, 738, 1855.

*Figured*: Hamps. 41: 6; Seitz 57: g3.

$M_2$  and  $M_3$  of hind wing short-stalked. This looks more like Herrich-Schäffer's original figure of *Charidea texta* (Auss. Schm. 281) than

either of the species usually identified as it, but the present name is safer. Larva pale yellow, with head largely black, and the long pencils black (U. S. Nat. Mus.).

Feb. 24, 27 (Fried.), 11 (A.M.N.H.). Mexico to Amazons. There are a few reared specimens from Geo. Franck's stock, labelled "Brownsville, Tex.," but the record should be verified.

#### 1517 HALYSIDOTA CATENULATA Hübner

*Hypocrita* (glaucopoidis) *catenulata* Hbn. Samml. Exot. Schm. i, 186, 1812. Also figured: Nov. Zoöl. xvii, 13: 18, 30 (as *walkeri* Roth.); Seitz 57: g1, f7 (var. *parva*).

Smaller and brighter than the related species, and usually distinguished at a glance by the two brown antemedial and postmedial bands. Fore legs fuscous, mid-legs heavily shaded with fuscous, but hind legs with a small spot on tibia only.

The commonest local species from Nov. to Feb. (see diagram). Mexico to Venezuela.

*Hal. major* Roth. is very close and has much the same range; it is slightly larger, paler, and shows a pale discal dot superposed on the dark postmedial band.

#### 1529 HALYSIDOTA IRIDESCENS Schaus

*Munona iridescens* Schs. Proc. Zoöl. Soc. 1894, 233. Figured: Hamps, 41: 9; Seitz 59: h6 (unrecognizable).

Fresh specimens show the veins are light olive. The dark dots in Hampson's figure are doubtless an error of engraving, carefully copied and exaggerated by Seitz.

Nov., Dec., Jan., Feb. (Bts., Fried.). Mexico to So. Brazil.

Perhaps *Munona* can be kept as a subgenus, based on the small short hind wings and aberrant appearance.

#### (1509) HALYSIDOTA STRIGULOSA Walker

*H. strigulosa* Wlk. List Lep. Ins. Br. Mus. iii, 737, 1855. *H. pseudomanda* Roth., Nov. Zoöl. xvii, 65, 14: 2, 1910.

I am not sure of either of these names; the species stands with *rhomboidea* in the Nat. Mus. but is distinct both in the stalking of  $R_2$  and the pattern. Thorax and fore legs solidly pale, without the brown



spots or shades of some other species. Lunulate lines on fore wing very deeply looped, but less than in the true *rhomboidea*.

Nov. 12 (Bts.) two identical males, Feb. 9 (A.M.N.H.). I have the same thing from the Upper Amazon and S. Brazil. *H. strigulosa* was described from Para, *pseudomanda* from Peru.

### PURIUS Walker

Transitional between Halysidota and Calidota.  $Cu_1$  from close to angle of cell, acc. cell present; palpi oblique, shorter than in Calidota.

### 2024 PURIUS PILUMNIA Stoll

*Bombyx pilumnia* Stoll in Cr. Pap. Exot. iv, 36, 307; D, 1780.

Also figured: Hamps. fig. 184; Seitz 53: f4 (hardly recognizable).

Fore wing pearl gray, dotted and spotted with black; abdomen black ringed, typically on a pink ground, but pearl gray in Mexican males. This species also stands in the National Museum under a ms. name of Dyar's.

Nov. 13, Jan. 26, Feb. 2 (Bts.) Mar. 13 (A.M.N.H.). Mexico to Amazons.

### CALIDOTA Dyar

Accessory cell present;  $M_3$  in fore wing well separated from  $Cu_1$ ; palpi with third segment long and porrect. Larva (of the North American *C. strigosa*) with dense feathery hair as in other Phegopterines, but with only scattered long hairs in place of the usual pencils.

### 2010 CALIDOTA GEMMA Schaus

*Opharus gemma* Schs. Proc. Zoöl. Soc. 1894, 230.

Figured: Hamps. 49: 17; Seitz 56: c1.

Light brown, a black dot ( $\sigma^7$ ) or spot ( $\varnothing$ ) at end of cell of fore wing. Abdomen blackish with broad subdorsal yellow bands, joining over the top of the tail.

July-Aug. (Fairchild). Venezuela and Brazil.

*Euchætiæ* group (Milkweed Tussocks). Similar to Halysidota group; the moth with little or no shaggy hair on base of abdomen. The few larvæ known feeding on milky-sap plants, especially Asclepiadaceæ; with dense paired middorsal tufts, converging to the middorsal line, and with or without pencils. Pupæ short and stocky, but not glossy; cocoon less perfect than in Halysidota group.

This group includes the North America *Euchætiæ*s, *Tanada*, *Pygarcia* and *Euverna*.

### TANADA Walker (*Ammalo* in part)

Similar to *Ammalo* except for the smooth abdomen and simple pale coloring. Larva on *Asclepiadaceæ* and *Apocynaceæ*, as a rule.

#### 1339 TANADA INSULATA Walker

*Halesidota insulata* Wlk. List Lep. Ins. Br. Mus. iii, 734, 1855.

*Ammalo insulata* Jord. Nov. Zoöl. xxiii, 124 ff., figs. 1-3, 8 (genitalia).

*Figured*: Hamps. 37: 14; Seitz 53: g4; Holland, Moth Book 14: 3.

*Larva*: Swainson, Jour. N. Y. Ent. Soc. viii, 33, 1900; Hamps. Suppl. 195; Seitz p. 384.

Yellow, with black-spotted body. Larva black, with four red-brown segments, and white dorsal spots; hair black. On Jack-in-the-bush (*Cordia cylindristachya* R.S., Boraginaceæ).

Feb. 10 (A.M.N.H.), Apr. 9 (Fried.), July (Fairchild). La Venta, Panama (Jan.). Honduras, Mar., May. Southern U. S. to Brazil, the southern limit uncertain through confusion with *T. aurata* Btl. The latter has the front and more of the palpus blackish.

### METAXANTHIA Hampson

Wings narrower and more clean-cut than *Agoræa*; hind wing transparent, contrasting with fore wing.

1. Basal portion of fore wing fully scaled; third segment of abdomen solid black above.....*aureiventris*  
Fore wing with areas between veins translucent practically to base; third segment of abdomen above mostly (typically wholly) yellow.....*atribasis*

#### 1532a METAXANTHIA AUREIVENTRIS Rothschild

*M. aureiventris* Roth., Nov. Zoöl. xx, 591, 1913.

*Figured*: Hamps. Suppl. 56: 1.

Basal two thirds of fore wing blackish, unlike *M. vespiiformis* and *auranticauda*; last half of abdomen orange.

Jan. 5 (Bts.), Mar. 12-18 (A.M.N.H.). Costa Rica and Colombia (type).

## 1532b METAXANTHIA ATRIBASIS Rothschild

*M. atribasis* Roth., Nov. Zoöl. xx, 591, 1913.

*Figured:* Hamps. Suppl. 56: 2.

The present specimen has some black dorsal scaling on the third segment and may be rather an abnormal specimen of *M. vespiformis*.

July 30, 1924 (Banks) 1 ♀; described from Ecuador.

## AGOREA Herrich-Schäffer

Wings both alike and translucent, typically broad; body very small.

1. Antennæ of male broad, wings broad and blunt, body slight; abdomen with a full set of dorsal black dots. . . . . *minuta*

Antennæ of male narrow, wings more pointed, shaped as in *Halysidota*; body stouter with black dots on basal segments or none. . . . . *semivitrea*

## 1536 AGOREA MINUTA Schaus

*A. minuta* Schs. Proc. Zoöl. Soc. 1892, 288.

*Figured:* Biol. 79: 2; Seitz 55: e2.

Head and collar concolorous pearl gray.

Chief flight at end of October (see diagram). Mexico to So. Brazil.

## 1537 AGOREA SEMIVITREA Rothschild

*A. pellucida* Hamps. Cat. Lep. Phal. iii, 175, fig. 97, 1901 (not Sepp).

*A. semivitrea* Roth. Nov. Zoöl. xvi, 291, 1909.

Also *figured:* Hamps. Suppl. 56: 9; Seitz 55: e8.

The fork of Cu is emphasized with blackish, and also a spot at lower angle of cell.

Chief flight in Dec. (see diagram, p. 163). Mexico to Brazil.

## BITURYX Walker

Like Agoræa, except for the shorter palpi. The present species lies between the two Agoræas in appearance.

The following species belongs to a small group (Hampson's SECT. I) with a woolly tuft on end of female abdomen and whitish wings with dark veins. Besides the following and *B. intacta* and *venosata* there is an undescribed species from Texas.

Sepp. figures the larva of *B. pellucida*. It is rather sparsely hairy, with a pair of pencils near anterior end, the body striped, and marked with blue and a little red dorsally. It eats *Costus* (Scitamineae).

#### BITURYX PERVENOSA new species

Probably *B. venosata* auct. in part (Panama material).

Head, including base of antennæ and palpi, neck, collar, shoulders and fore coxæ bright yellow. Body pearl gray, a middorsal stripe and disc of tegulæ darker; abdomen yellow, with dorsal black dots in male and lateral ones in both sexes; the lateral series starting with the second segment; hoods pearl gray. Under side whitish, the sides and end of the female anal tuft mouse gray, except middorsally, the lower part cream white. Wings shading from white to pearl gray, with conspicuous dark gray veins, heavier than in the other species, especially on the hind wing. Fore wing shading to a strong gray toward margin. The hind wing is pure white except for the veins and broad gray anal area. ♂ 27, ♀ 35 mm.

Barro Colorado Id., C.Z., Panama (Bates), holotype male and 10 male and 2 female paratypes. Late Oct.-late Jan., May 12 (see diagram, p. 163). Cano Saddle, C.Z., May (Shannon) ♂ paratype in U. S. National Museum (type No. 51596).

The palpi are longer than in *B. venosata* and the Texas species, extending obliquely about to level of middle of front; *venosata* also has much darker wings, especially the male hind wings, and *intacta* should lack the gray veins on the hind wing. There are further undescribed species in South America.

#### Tribe BELEMNIINI (new)

Eyes small, ocelli distant from them, the head with a broad lateral scaled stripe behind them; front bowed out, the palpi barely exceeding it, but tongue strong; abdomen close-scaled; fore wing partly metallic; mid and hind tibiæ with fine spinules beneath; Sc of hind wing not reaching margin. Early stages unknown.

This is a distinct little group, intermediate between the Phegopterini and Euchromiidae; and perhaps should be transferred to the latter. The spined tibiæ and peculiar head will distinguish it in either family. The three genera are very close, only differing in  $M_2$  and  $M_3$  of the hind wing.

## BELEMNIA Walker

Hind wing with  $M_2$  and  $M_3$  completely united.

## BELEMNIA PAVONIA new species

Black, marked with metallic blue-green. Head with patches on sides of palpi, most of front, dots on vertex and occiput; whole sides behind eyes; thorax with large patches on sides, lateral ends of collar, fore pleuræ, a pair of spots anteriorly on disc, metascuta and center lobe of metascutellum blue; abdomen with lateral bars in front, becoming spots behind, but no dorsal blue; also sublateral blue spots on segments 2 and 3; venter scarlet on middle of 3 and whole of 4-8. Legs spotted and streaked with blue. Whole ground of body iridescent with deep pure green, strongest on middorsum of first segment of abdomen. Fore wing evenly dusted with green, leaving the apex and outer margin black; with blue at base; hind wing dead black, with a large blue basal patch, extending somewhat on cell, and in a point below fold. Under side black, fore wing with a blue patch over cell and above fold to  $1/3$ , an irregular bar over end of cell, and a diffuse green shade on pm. region; hind wing with the basal blue shorter, but extending from costa to below fold, and two separate dots at angles of cell. Fringes white.

This species resembles *Diospage engelkei*, but has less bright blue on thorax and more postmedially on under side, besides the different venation; it is closest to *B. alpha*, but instantly separable by the scarlet under side, and lack of white apices of the wings.

Barro Colorado Id., Feb. 7 (Bates); 1 ♂.

## DIOSPAGE Walker

Hind wing with  $M_2$  and  $M_3$  stalked about half way to margin.

1. Red band of fore wing beneath cut off at  $Cu_1$ ; veins across red patches above and fringe of hind wing scarlet; green base of fore wing cut off squarely.....*chrysobasis*  
 Red band of fore wing beneath curving and extended to A; veins across red patches and fringe of hind wing black, contrasting; basal green of fore wing gradually tapering off, and extending much further below costa.....*splendens*

## 1618 DIOSPAGE SPLENDENS Druce

*Belemnia splendens* Dr. Ann. Mag. Nat. Hist. (6) xv, 44, 1895.

*Figured:* Hamps. 43: 10; Seitz 42: d5.

Typically there is a crimson spot on middle of fore wing which is lacking in these two specimens.

Nov. 26 (Bts.). Peru and Bolivia.

## 1619 DIOSPAGE CHRYSOBASIS Hampson

*D. chrysobasis* Hmps. Cat. Lep. Phal. iii, 212, 43: 13, 1901.

Also *figured:* Seitz 42: d6.

Feb. 4 (Bts.) May 3 (Fried.). Described from Colombia.

## BELEMNIASTIS Hampson

M<sub>2</sub> and M<sub>3</sub> of hind wing merely connate. Fore wing rather more ample.

## 1623 BELEMNIASTIS TROTSCHI Druce

*Belemnia trotschi* Dr. Ann. Mag. Nat. Hist. (6) xviii, 37, 1896.

*Figured:* Biol. 72: 25, 27; Hamps. fig. 122; Seitz 42: e3 (band of fore wing scarlet, in error).

The band of the fore wing is orange, and much wider than in the preceding species.

May 5 (Fried.). Described from Costa Rica.

## Tribe ARCTIINI

Larva with numerous more or less equal tufts of barbed hair, representing all the ordinary tubercles; the longer hair when present scattered, not forming pencils or special tufts; pupa with flange-plates in front of spiracles of abdominal segments 4-6; tongue shorter than wing-cases. Imago with tongue always short or rudimentary; palpi usually barely exceeding front; hind wing with Sc complete, normal.

This is a typically Old-World group, and also strongly represented in the Nearctic, mostly by Old-World genera, but is very weakly represented in the Neotropical. Only the *Eubaphe* group is American, and best developed in the tropics.

*Eubaphe* Group: R<sub>5</sub> stalked beyond R<sub>3</sub>, typically united with R<sub>4</sub>; hind wing with one medial lost; palpi beaklike, the second segment curved down, and third long and porrect.

## VIRBIA Walker

R<sub>4</sub> and R<sub>5</sub> stalked. Closely related to the Nearctic genus *Eubaphe* and perhaps the Neotropical *Brycea*, but without other close kin.

1. Patch on hind wing widening strongly to costa, especially below;  
neck red . . . . . *orola*  
Patch on hind wing covering outer half except border, or more  
extended; neck not red . . . . . 2
2. Hind wing with an orange patch on outer half . . . . . *fluminea*  
Orange area of hind wing reaching base . . . . . 3
3. Base of costa of hind wing below yellow . . . . . *rosenbergi*  
Costal stripe of hind wing below reaching base . . . . . *underwoodi*

## 1596d VIRBIA ROSENBERGI Rothschild

*V. rosenbergi* Roth., Nov. Zoöl. xvii, 77, 1910.

*Figured:* Hamps. 56: 24; Seitz 38: d6 ♂, 7 ♀ (as *medarda*).

*V. medarda* auct. in part, not Stoll.

Fore wing with more or less overscaling, varying from blackish to dull olive in color effect. Under side with orange on disc very variable, but always with a little along base of Cu. Border of hind wing extremely variable, but never extended toward base in a sharp wedge on fold, in some females extended as a broad area; beneath with yellow abruptly extended across costal area at base. The female is much larger, and averages darker than the male.

Abundant (see diagram, p. 163). Reported by Hampson from Mexico to Ecuador. Replaced in northern South America by the true *medarda* (♀ *mentiens* Wlk.) with the black border of hind wing extended in, in a sharp point on fold.

## 1593a VIRBIA OROLA Dyar

*V. orola* Dy. Proc. U. S. Nat. Mus. xlvii, 173, 1914.

July-Aug. (Fairchild, Nat. Mus.). Described from the Canal Zone.

## 1596e VIRBIA UNDERWOODI Druce

*V. underwoodi* Dr. Ann. Mag. Nat. Hist. (8) viii, 140, 1911.

*Figured:* Hamps. Suppl. 56: 25 ♀.

If I have the male of this species correctly identified, it is smaller and blunter winged than *V. rosenbergi*, with very heavy black border of hind wing.



Mar. 17 (A.M.N.H.). There is a similar ♂ from Colombia in the Cornell collection, and females resembling the figure have been examined from Lancetilla, Honduras (Bts.), Costa Rica and Colombia.

### 1598c VIRBIA FLUMINEA Schaus

*V. fluminea* Schs. Ann. Mag. Nat. Hist. (8) ix, 39, 1912.

*Figured:* Hamps. Suppl. 57: 5.

Nov. 2, 9, 15, Jan. 28 (Bts.), Feb. 17 (A.M.N.H.). Described from Costa Rica.

*Arctia* Group: Palpi short as well as tongue; base of abdomen frequently shaggy; fore wing with  $R_3$  and  $R_4$  stalked beyond origin of  $R_5$ , or stalked from accessory cell.

### ECPANTHERIA Hübner

The largest of American Arctiids. Essentially tropical but with one species extending well into the Nearctic. The larvæ are black and dull red, with rather equal tufts of very stiff black hair. I have revised the genus (Ann. Ent. Soc. Am. xxii, 310-330, 1929, xxvi, 560-562, 1933).

1. Fore wing black spotted.....*læta*  
Fore wing marked with dark rings, or immaculate.....2
2. Males (hind wing lobed, frenulum simple).....3  
Females (hind wing not lobed; frenulum triple).....4
3. Antenna serrate; no hair pencil on lobe of hind wing beneath;  
ocellate spots normal when traceable.....*icasia*  
Antenna simple; a hair pencil on lobe of hind wing beneath; ocelli  
about end of cell contrastingly dark, frequently black....*orsa*
4. Abdomen orange, with white subdorsal bars.....*icasia*  
Abdomen blackish or with heavy blue spots.....*orsa*

### 1909 ECPANTHERIA LÆTA Walker

*E. læta* Wlk. List Lep. Ins. Br. Mus. iii, 696, 1855.

*E. læta* Forbes, Ann. Ent. Soc. Am. xxii, 329, 1929.

*Figured:* Seitz 40: e2 ♂.

Hind wing of male with a very large lobe, but without pencil; the wing yellow with a black patch on lobe.

Feb. 8, 14 (A.M.N.H.), Mar. 1-8, Apr. 7, 28, May 24, June 18 (Bts. & Fried.). Ranges south to Brazil.

## 1929 ECPANTHERIA ICASIA TRINITATIS Rothschild

*E. trinitatis* Roth., Nov. Zoöl. xvii, 173, 1910.

*E. i. trinitatis* Hamps. Suppl. 453, Forbes, Ann. Ent. Soc. Am. xxii, 319, 328, 1929.

I know of no figure of this form. Form *yukatanensis* is figured by Obt. Études Ent. vi, 13: 4.

The entire series from Barro Colorado Id. are an albinic race, with the black markings practically lost, and the white on the abdomen showing a strong tendency to make transverse stripes across the segments. The male can be separated from *E. eridanus* Cr. by the much narrower antenna, but some of these females may be indistinguishable. In the specimens that show traces of ocelli they are normally large, in *eridanus* minute (see Hübner, Samml. i, 191).

Dates scattering (see diagram, p. 163). This race covers southern Central America and northern South America to Peru, except a limited area in Colombia.

## 1927, 1925, 1919 (part) ECPANTHERIA ORSA Cramer

*Bombyx orsa* Cr. Pap. Exot. ii, 75, 143: F, 1777.

*Bombyx cunigunda* Stoll, in Cr. Pap. Exot. iv, 104, 344: D, E, 1781.

*Ecpantheria orsa* Forbes, Ann. Ent. Soc. Am. xxii, 323, 329, 1929.

Also figured: Oberthur, Études Ent. vi, 14: 1, 2, 3, 5, 6, 15: 6 (various forms); Hamps. Suppl. 63: 3 (var. *perplexa*); Seitz 40: h2, i1, i5, 67: e6 (various forms).

The species divides up into a number of ill-defined races, and varies individually. For an analysis see my paper, cited. The Barro Colorado form is reasonably typical.

Nov. 28, Dec., Mar. (Bts.). Type form from Northern South America, races in Central America and southward.

## APANTESIS Walker

An essentially North American genus, normally with fore wing blackish, cut up by pale vein-streaks and lines, and bright red or yellow, black spotted hind wing.

## 1958 APANTESIS PROXIMA Guérin

*Chelonia proxima* Guér. Icon. Règne Anim, iii, 514, 1844.

*Arctia mexicana* Grt. & Rob. Ann. Lyc. N. Y. viii, 367, 13: 3, 1867.

Also figured: Stretch, Zygaenidæ & Bombycidæ 9: 4 (*arizonensis*); Holland, Moth Book 16: 32 (♂ as *autholea*), 15: 4 ♀; Seitz 39: b2 ♂, 3 ♀.

Hind wing of male white, of female red and black.

Feb. 17 (A.M.N.H.). Ranges to western U. S.

### Tribe UTETHEISINI

Larva with simple stiff bristles, mostly single; skin brilliantly colored; pupa brilliantly colored, with cremaster but without flanges, in a very flimsy cocoon.

This is an Old World group save for two species, one limited to the Galapagos. *Utetheisa ornatrix* L. is reported by Dyar from the Canal Zone, and will certainly be found on the Island if there is a patch of *Crotalaria* anywhere.

## PERICOPIDÆ

Separable from the preceding groups by the shorter fusion of Sc and R of the hind wing near base, the veins being united for  $1/5$  the length of the cell or less, sometimes very shortly. This character is shared by the Noctuidæ, but the few types of the latter which have a large tympanic hood above the spiracle are small and obscure (*Herminiinæ*), while all of the present family are showy. Larvæ exactly as in the Arctiinæ, except that wart iv of 7th abdominal segment is markedly lower than on the segments preceding and following. The proleg hooks are abruptly shorter at the ends of the rows (heteroideous).

This family is very close to the Old World Hypsidæ, and is not always separated. Both are treated as mere subfamilies of the Arctiidæ in Seitz. In the typical Hypsidæ Sc and R are not fused at all, but connected by a cross-vein. Nyctemera has a short fusion like Pericopidæ. The larvæ of the *Hypsa* group feed on Ficus, of *Nyctemera* and *Tyria* on Senecio, like *Pericopis sacrificia*.

1. Hind tibia with both pairs of spurs; fore wing with  $R_2$  shortly stalked on  $R_{3-5}$ .....*Eucyane*  
Hind tibia with end spurs only.
2. Fore wing with  $R_2$  from accessory cell or occasionally free.  
*Pericopis*  
 $R_2$  stalked with  $R_{3+4}$  beyond the origin of  $R_5$ .....*Hyalurga*

EUCYANE Hübner (with *Esthema* Hübner)

Black with strong blue iridescence. In the typical group there is a white, red or yellow transverse band; the following species belongs to group *Esthema*, with white streaks between the veins.

## EUCYANE ALETTA Stoll

*Phalæna aletta* Stoll in Cr. Pap. Exot. iv, 221, 396: C, 1782.

Also *figured*: Preiss, Abbild. Nachtschm. 10: 1; Seitz 61: c1.

The white markings are a single series of spots between the veins toward margins, becoming streaks toward inner margin of hind wing. The spot in  $M_3$  is markedly the shortest.

July-Aug. (Fairchild), Dec. 24 (Bts.). Guatemala to Ecuador and Guiana.

## PERICOPIS Hübner

Striking moths of very varied pattern, the female frequently very unlike the male and mimicking *Lycorea*, the first genera of *Ithomiinæ*, or even the *Aristolochia* *Papilios*. The *Pericopids* are of rubery texture, and the mimicry is undoubtedly Müllerian.

The larvæ have regular tufts with a few longer hairs, and are brilliantly colored (see Seitz under *P. leucophæa*, *lycaste* and *sacrifica*).

1. Collar with two yellow spots on each lobe, sometimes fused into a large yellow patch. . . . . 2  
     Collar black, without yellow spots; the thorax behind collar sometimes with large yellow spots. . . . . 4
2. Yellow spots on collar small, similar to spots on head and somewhat larger ones on disc of thorax. Fore wing with base heavily black-marked on an orange ground, or if solid blackish with the outer boundary irregular. . . . . *angulosa*  
     Yellow spots on collar large, almost or quite joining; basal part of fore wing varying from yellowish gray to dirty pale orange, not black or bright orange marked with black. . . . . 3
3. Hind wing yellow, the border solid black or marked with a red anal spot. . . . . *tricolora* ♂  
     Hind wing evenly orange, with a white-spotted black border. . . . . *molesta*

4. Base of fore wing blackish out to an oblique line; shoulders with large yellow spots; hind wing yellow (♂) or orange (♀) with broad white-spotted black border. . . . . *marginalis*  
 Thorax and most of fore wing solid blackish; hind wing black, with a pink anal patch. . . . . *tricolora* ♀

#### PERICOPIS TRICOLORA JANSONIS Butler

[*Phalæna Noctua tricolora* Sulz. Gesch. Ins. 160, 22: 1776; Cramer, Pap. Exot. iii, 125, 263: E, 1779.]

[*Phalæna aglaura* Cr. Pap. Exot. iii, 126, 263; F, 1779.]

*P. jansonis* Btl. Lep. Exot. 46, 17: 4, 5 ♀, 1870.

Also figured: Biol. 11: 10 ♂ (*jansonii*).

In the Panama and Colombia race *jansonis* the male usually has a red anal patch, and in the female the red patch is rounded, and unbroken, unless there is a small separate spot above Cu<sub>2</sub>.

Dec. 30 (Bts.) ♀. Busck also took the male in the Zone. The species ranges south to southern Brazil.

#### PERICOPIS MARGINALIS PANAMENSIS Hering

[*Daritis marginalis* Wlk. List Lep. Ins. Br. Mus. iii, 618, 1855. ♀]

[*Pericopis dissimulans* Wlk. List Lep. Ins. Br. Mus. xxxi, 155, 1864 ♂.]

*P. m. panamensis* Hrg. Macrolep. World vi, 442, 1925.

Races of *marginalis* are figured in Seitz 63: d1, 2 (*crassifascia*) and f1 (*magdala*).

In the Panama race the male has the irregular patch beyond the cell considerably scaled with white, and the veins all around the cell are finely blackish; the female has the black postmedial line fine, and typically fading out before the anal angle; in *P. m. magdala* the veins behind the cell of the male are whitish or partly red. Southern races have the postmedial part of the fore wing more transparent in the male, and the postmedial line of the female hind wing heavy toward the anal angle.

Nov., Jan., May, July-Aug. Race *panamensis* was described from Chiriqui; races range from Guatemala to Bolivia.

#### PERICOPIS MOLESTA Hering

*P. molesta* Hrg. Macrolep. World vi, 443, 63: g4 ♂, 1925.

? *P. umbra* Druce, Biol. Centr. Am. Het. i, 113, 12: 2, 1885 ♀.

The Barro Colorado Id. specimens are smaller than Hering's figure, but agree in pattern. I strongly suspect this is merely the ♂ of

*P. umbra*, described from Salvador. The latter has the same body and fore wing pattern, but the hind wing has a black postmedial band, extending out and in on the veins. The hind wing is orange, even in the male.

Nov.-Dec. (Bts.). Popayan, Col. (type).

Dyar also reports *P. angulosa irenides* Btl. from the Zone. It resembles normal *angulosa* (Seitz 62: b2), but the postmedial band is all yellow; and the base much darker, sometimes wholly black.

### HYALURGA Hübner (with *Lauron* Walker)

In most species the pattern is similar, a paler ground with black borders, more or less overlaid with orange, and generally a fascia across the end of the cell. The pattern varies some, and the body-patterns seem to give the best specific characters.

The larva of *H. vinosa* (the Antillean species) is yellow, variegated with wine color, with segments A1, 2, 7, 8 dark; the warts mostly blue. The hair is rather sparse, i and iv having single hairs. It feeds on *Tournefortia* and heliotrope.

1. Smaller species; lower discocellular of hind wing longer; sides of thorax largely orange (*Lauron*).....2  
     Larger species; lower discocellular of hind wing very short; sides of thorax white or with a black stripe only (*Hyalurga*).....3
2. Propleura also orange; 1st A and veins of hind wing black in both sexes; some orange in postmedial fascia before the subapical white patch.....*soroides*  
     Propleura black and white; 1st A and veins of hind wing white in male; no orange in postmedial fascia.....*leucophæa*
3. Subdorsal stripes of abdomen solid orange, except on first and last segments.....*fenestra*  
     Subdorsal stripes mostly white or light gray, but with addorsal yellow spots on second segment.....*albovitrea*

### HYALURGA FENESTRA Linnæus

*Phalæna Bombyx fenestra* Linn. Syst. Nat. (Ed. 10) i, 505, 1758; Mus. Lud. Ulr. 372, 1764, Clerck, Icones 55: 41; 1764.

*Sphinx adscita egeon* Cramer, Pap. Exot. i, 91, 59: B, 1775.

Also figured: Seitz 65: a1 (Panama race).

The thorax has a black line below the wings. Typically the hind wing has well separated marginal and submarginal black lines (as

figured by Cramer), in Panama specimens these are largely fused into a broad black border.

Mar. 29, 31 (Fried.) 2 ♀. Ranges to So. Brazil.

### HYALURGA ALBOVITREA SUBNORMALIS Dyar

[*H. albovitrea* Wlk. List Lep. Ins. Br. Mus. xxxi, 153, 1864.]

[*H. irregularis* Fld. Reise Novara Lep. 103: 16, ♂, 1874.]

*H. subnormalis* Dyar, Proc. U. S. Nat. Mus. xlvii, 174, 1914.

Figured: Seitz 65: d1 ♂ (Also c4 ♀ of *albovitrea*).

Strongly sexually dimorphic. Male ground white, the most conspicuous mark a gray spot at end of cell; female gray with white postmedial spot on fore wing and bar along cell of hind wing. The typical (South American) male has a black border on the hind wing, and yellow marginal spots in cell  $Cu_1$  of both wings, lacking in the Panamanian males. I see no difference in the females.

Feb. 3, fresh ♂ (Bts.), May 1, rubbed ♀ (Fried.). *Subnormalis* was described from the Canal Zone, typical *albovitrea* from the Amazon.

### Group *vinosa*

I am now inclined to believe there are about three species of this group, differing in the distribution of orange on the thorax. Typical *vinosa*, with the thorax dominantly orange, is practically limited to the Antilles, unless *H. chthonophyle*, from Mexico is a race of it. The two mainland stocks differ in the color of the side of the prothorax, and perhaps in details of fore wing pattern in any one locality, but the latter varies so much racially that forms cannot be placed until types are examined. The color of the prothorax is never mentioned in descriptions or shown in figures, so the use of names is uncertain. I suspect one of the two following is the true *sora* of Boisduval (Lep. Guat. 79). But only the type will decide which.

### HYALURGA LEUCOPHÆA LEUCOPHLEBIA Hering

[*Diophtis* (*Lauron*) *leucophæa* Wlk. List. Lep. Ins. Br. Mus. ii, 334, 1854.]

*Hyalurga leucophlebia* Hering, Macrolep. World vi, 450, 65: e2 ♂, 3 ♀, 1925.

Translucent with black border and veins, and apical third of fore wing, the latter containing an elliptical white fascia. Orange stripes on basal half of costa, inner margin, lower part of outer margin and border



of hind wing, but none before the postmedial fascia. Female larger and darker than male, the black veins heavy and the translucent portions much darkened by fine black scales.

Oct. 29, Dec. 25, Jan. 31 (Bts.) all females; Dec. 25 (Am. Mus. Nat. Hist.) ♂. Amazon tributaries, Venezuela, E. Peru (Cornell). Distribution uncertain through confusion with the following.

### HYALURGA SOROIDES Hering

*H. soroides* Hrg. Seitz Macrolep. World vi, 450, 65: e5 ♂, 6 ♀, 1925.

*Laurona rica* Dr. Biol. Centr. Am. Het. i, 156 (not Hübner).

Identical with the preceding except as noted in the key. I suspect an older name for this, perhaps *sora*, under which it stands in the U. S. Nat. Mus.

June 24 ♂ (Fried.), July-Aug. ♀ (Fairchild), Apr. 2 ♂ (Bradley-C.U.). "Mexico to Colombia" (Hering).

### B. *Agaristidæ*, *Lymantriidæ*, *Notodontidæ*, *Dioptidæ*

This second installment completes the types with thoracic tympanum, except for the very large family Noctuidæ. The material is as before, except for the addition of a lot collected by an American Museum Expedition composed of F. E. Lutz, W. J. Gertsch, and Wm. C. Wood in February and March, 1936. Unfortunately the Fairchild material is very scant in these families, so that summer is almost a blank. Collecting at that time will certainly add several more species, though the Notodontidæ, the principal family of this installment, have wide ranges and long flight periods.

Of the four families now discussed, the Agaristidæ are a mere offshoot of the Noctuidæ, being directly connected to the Eudryas-Erocha group of the Acronyctinæ, and like them feed chiefly on Vitaceæ. The Lymantriidæ are a degenerate offshoot from the ancestors of the five preceding families; while the Notodontidæ and Dioptidæ are very closely related to each other, and probably ancestral, having a trifold venation, and a more primitive condition of the tympanum, but agreeing in the essential features of tympanum, egg and larva. The Dioptidæ are a minor offshoot of the Notodontidæ, and should be probably relegated to a subfamily, but they differ widely in appearance, being slender and brilliantly marked, and in habits, being generally active day-fliers. They are also strictly Neotropical

(save for one species in western U. S.), while the other three families are world-wide (save that the Agaristidæ miss Europe).

The following are the principal works on the area, so far as concerns these families.

DRUCE: *Biologia Centrali-Americana*, Lepidoptera Heterocera, 2 vols. text and 1 of plates (abbreviated in the citations of figures as "Biol." with plate and figure numbers).

HAMPSON, G. F.: *Catalogue of the Lepidoptera Phalænæ*, iii and supplement ii (Agaristidæ).

PROUT, L. B.: A Provisional Arrangement of the Dioptidæ, *Nov. Zoöl.* xxv, 395-429, 1918.

SEITZ, A.: *Macrolepidoptera of the World or Grossschmetterlinge der Erde*; vi, *Lymantriidæ* by Schaus, *Dioptidæ* by Hering, *Notodontidæ* by Draudt; vol. vii, *Agaristidæ* by Draudt. (abbreviated "Seitz" with plate, line, and figure counting from the left).

BRYK, F. (Editor): *Lepidopterorum Catalogus*. Part v, *Agaristidæ* by Strand, 1912; lxii, *Lymantriidæ* by Bryk, 1934; lix, *Notodontidæ* by Gæde, 1934; xlii, *Dioptidæ* by Bryk, 1930.

DYAR, H. G.: *Proc. U. S. National Museum* xlvii, 139, 1914 (giving further Canal Zone data for many species).

SCHAUS, WILLIAM: A revision of the *Notodontidæ*, *Trans. Ent. Soc. London*, 1901, 257, ff. (with index on pp. lxx-lxxii).

SCHAUS, WILLIAM: New Moths of the Family *Ceruridæ*, *Proc. U. S. Nat. Mus.* lxxiii (19,) 1928.

In these families Hampson fails us (save for two Agaristids) and Seitz contains a larger number of new figures, but the delicate shadings and patterns have proved too difficult for the artist (or for the process) and many are unrecognizable. Hering's treatment of the *Dioptidæ* can fairly be called a revision, especially as supplemented by Prout's generic analysis and catalogue (*Nov. Zool.* xxv, 395, ff. 191); but the *Lymantriidæ* and *Notodontidæ* need major revision from the world point of view; our present classifications are artificial, and even inconsistent from fauna to fauna.

Dates are presented as in the previous installment.

## AGARISTIDÆ

Head with strong palpi and tongue, the front heavily chitinized and modified, antennæ simple, distinctly swollen toward their tips (unlike the Noctuidæ); tympanum of Noctuid type, with a very large resonating cavity in the dorsum of the first abdominal segment, facing the counter-tympanic membrane. Venation as in the Acronyctinæ, with Cu quadrifid in fore wing, trifid in hind wing ( $M_2$  obsolescent), Sc and R touching at basal quarter of cell, connected by an extremely short cross vein or barely fused. Larva with simple hair, usually humped on 8th abdominal segment, brilliantly marked with black, white and orange; feeding on Vitaceæ and occasionally Onagraceæ. Pupa rugose, with minute single setæ, those of the cremaster minute; cremaster broad, flat and thin.

The two regional species belong to a primitive American group very close to Eudryas in the Acronyctinæ.

1. Acc. cell with  $R_2$  stalked from its tip in both sexes;  $M_1$  from its posterior side. . . . . *Euschirropterus*  
 Acc. cell normal, with  $R_2$  separate from before its tip (unless obliterated by the very large stridulating organ);  $M_1$  free in both sexes. . . . . *Darceta*

DARCETA Herrich-Schaeffer (*Diamuna* Walker)

Front with a truncate conical prominence; antennæ slender; abdomen without dorsal tufts; eyes very large.

## DARCETA FALCATA Druce

*Hecatesia falcata* Dr., Biol. Centr.-Am. Lep. Het. i, 35, 5: 23 ♂, 24 ♀, 1883.

*Diamuna falcata* Hmps. Cat. Lep. Phal. iii, 651, fig. 286, 1901.

*Darceta falcata* Strand, Lep. Cat. v, 38, 1912.

Also figured: Seitz vii, 1: b9.

Brown, fore wing in male with a large bulla and modified venation, doubtless for stridulation, the female normal. Hind wing yellow with black border, in northern specimens nearly limited to the outer margin, in the southern race *hesperina* H.-S., from Santa Catherina, extending along inner margin nearly to base. A specimen in the Nat. Mus. from Peru is transitional.

Jan.-June (see diagram). All the 16 specimens seen from B.C.Id. are females. Described from Panama.

Dyar also describes *Euschirrhopteryx poeyi pulverosa* from the Canal Zone. The male is nearly transparent, with somewhat modified venation, the female fully scaled with the costal half of fore wing contrastingly paler than the dorsum.

## LYMANTRIIDÆ

(*Liparidæ*)

Ocelli and tongue absent; palpi frequently reduced; antennæ very broadly pectinate in both sexes, usually pectinate to the tip in male, and with the shaft bowed. Legs generally heavily tufted, the fore tarsi also with heavy tufts and displayed at rest. Fore wing as in related families, the accessory cell frequently broad, and  $R_1$  arched in such a way as almost to enclose a second acc. cell. Hind wing with Sc and R touching, connected, or very slightly anastomosed about middle of length of cell; Cu quadrifid in both wings, but generally with a rather distinct transverse vein (ldev) between origins of  $M_2$  and  $M_3$ . Tympanum of the true Noctuid type, the membrane vertical; frequently with hood above spiracle on first segment of abdomen.

There have been attempts to divide the family on the presence or absence of the acc. cell, or the curvature of the base of  $R_2$ , whether or not it encloses a true acc. cell, but these systems separate very closely allied forms. A more natural division is on the basis of the larva, which is of three types: 1, with sparse irregularly tufted hair, poison spinules and brilliantly marked body (the Brown-tail type); 2, with regular and subequal tufts, the lateral ones longer, at least on prothorax (the Gypsy type) and 3, with massive dorsal tufts on about 4 middle segments and slender pencils at ends of body (the Tussock type). The primitive African Lymantriidæ seem to be related to the first type; of the present genera, *Thagana* and *Caviria* belong with the brown-tail; *Sarsina* and *Stætherinia* to the Gypsy type, while *Desmoloma* is an isolated genus with unknown larva, and may not be a true Lymantriid.

Larva of the present genera (Lymantriinæ) with tufted hair from warts, three subdorsal warts each on meso- and metathorax; and two (in the Satin-Moth 3) small middorsal eversible glands on posterior

segments. Pupa densely hairy, in a slight cocoon, partly formed of the larval hair; tongue short, leaving the palpi uncovered.

1. Fore wing with acc. cell, formed between  $R_{2+3}$  and  $R_{4+5}$ ,  $R_1$  free or from its base; hind tibia with end spurs only; white moths.

*Caviria*

Fore wing without accessory cell,  $R_1$  sometimes sinuous in such a way as almost to form an acc. cell *above*  $R_2$ .....2

2. Hind tibia with both pairs of spurs; fore wing as a rule with colored wings and full pattern.....3

Hind tibiæ with end spurs only; fore wing with  $R_1$  usually sinuous,  $R_2$  stalked, or rarely connate.....*Thagiona*

3. Fore wing with  $R_2$  stalked,  $R_{4+5}$  free from  $R_{2+3}$ , the costal venation crowded; male hind wing with lobed costa.....*Desmoloma*

Fore wing with all radials distinct;  $R_1$  and  $R_2$  free,  $R_{3-5}$  stalked..4

4.  $R_5$  barely stalked; apex squarish.....*Sarsina*

$R_5$  decidedly stalked; apex subfalcate.....*Stætherinia*

#### CAVIRIA Walker

Palpi just exceeding front, the joints well set off; fore tibiæ with moderate tuft, the tarsi with a little loose hair; fore wing with  $R_1$  typically free from  $R_2$ , anastomosing with Sc but individually variable; hind wing with R and  $M_1$  free;  $M_3$  and  $Cu_1$  widely separated.

Larva (of *C. comes* Geyer, Jörgensen, Rev. Soc. Ent. Argent. ii, 32). Slender, dark green, the hair long and sparse, pale gray with some black; body with yellow dorsal line, and reddish spots on one anterior and 2 posterior segments. Head, etc., greenish yellow. The larva is lively. Pupa in a slight web; green with white hair, yellow dots and a pair of white spots on second segment.

#### CAVIRIA VINASIA Schaus (Fig. 66)

*C. vinasia* Schs. in Seitz Macrolep. World vi, 544, 74: b4 ♂, 3 ♀, 1927.

Also figured: Biol. 15: 1 (as *substrigosa*).

Silky white, the fore wing with three bands of watering, whose position varies with the lighting, the two outer slightly sinuous, but not in corresponding waves. Palpi white; fore tibiæ shaded with gray.

Common (see diagram, p. 245). Costa Rica (type). Probably examination of genitalia will be needed to understand this group in South America. The National Museum has similar specimens (with white palpi) from Northwestern South America under the name of *regina*.

## THAGONA Möschler

Fore tibia with a moderate tuft and metatarsus with a smaller one, or both (♀) with loose hair.  $R_1$  sinuous and  $R_2$  stalked (least in *T. tibialis*).

1. Fore wing heavily marked with light brown.....*taus*  
Fore wing white.....2
2. Fore wing thickly scaled, usually with a few black dots. . .*tibialis*  
Fore wing translucent, with two fine oblique parallel light brown  
lines.....*pura*

## THAGONA TAUS Dyar

*Caviria taus* Dyar, Proc. Ent. Soc. Wash. xii, 85, 1910.

Figured: Seitz 72: k6 ♂.

Mixed white and light brown; a fine brown line in base of cell and black dash in middle of fold; base white toward inner margin only.

Feb. 12 (A.M.N.H.) 1 bad ♀, apparently of this species. Described from Guiana.

## THAGONA PURA Walker

*Stilpnotia* (?) *pura* Wlk. List Lep. Ins. Br. Mus. vii, 1732, 1856.

Figured: Seitz 72: k3.

Feb. 28, Mar. 2, 4, Apr. 26 (Fried.) all females. Ranges to the Amazons and Costa Rica. The male has much shorter wings.

## THAGONA TIBIALIS Walker

*Stilpnotia* (?) *tibialis* Wlk. List Lep. Ins. Br. Mus. iv, 842, 1855.

Figured: Seitz 73: i6 ♂, 5 ♀.

Larva: Jørgensen, Rev. Soc. Ent. Argent. ii, 32, 1928; Iris xlvii, 41, 55, 1932.

White, with a maximum of four black dots, two in end of cell, one just beyond and a postmedial one in cell  $M_2$ , the dots often reduced or lost. Sides of palpi and back of head black; black stripes on fore tibia and all tarsi of female only.

Larva bluish white; a hump on segments 8-10 with yellow, confluent black-bordered patches, a black lateral line and yellow subventral spots; hair mostly white, a few black; head blackish, with white front etc. A general feeder. Pupa green with black pattern and white hair.

Oct. 6, Dec. 4, 6, Feb. 3. Mexico to Argentina.

## SARSINA Walker

The three following genera agree in having colored wings, palpi extending beak-like well beyond the front; and the known larvæ are flattened with enlarged lateral warts, much like the Lasiocampidæ but more lively.

Sarsina is light pinkish brown, marked with darker brown with a slight olive tint; ante- and postmedial and subterminal lines fine and brown; broad brown bands subbasally, before antemedial, medial on costal half, before t.p. and marginal. The few nominal species are very close, and I suspect all one.

## SARSINA PURPURASCENS Walker

*S. purpurascens* Wlk. List Lep. Ins. Br. Mus. iv, 800, 1855.

*Figured:* Seitz 74: e6 ♂, 7 ♀.

(For further nominal species possibly synonymous, see Seitz l.c.)

Larva (Mexico, U. S. Nat. Mus.). Dorsal hair (on i and ii) short, lateral long but of graded lengths on iii-v, wart iv subordinate to v; the lateral lobes of prothorax with long hair; mottled, with double dark dorsal line, black dorsal patch on front of metathorax; black about tubercles of 4th segment of abdomen and a fine oblique line down sides of 7 and 8. Pupa naked, suspended, smooth, ruptively colored, with a black dorsal triangle on front of thorax, whitish face-plate, etc. Jörgensen (l. c.) also describes the larva of *S. violascens* from Paraguay as having two large black and yellow eyespots on the metathorax. Food *Mikania scandens* (Compositæ).

Common (see diagram, p. 245) mostly females, 1 ♂. Ranges north to Mexico and in variants south to the Argentine.

## STÆTHERINIA Butler

Similar to Sarsina except as stated in key. Hind wing bent at Cu<sub>2</sub>, wings squarish. General effect of shape and pattern like the Apatelodes group of Eupterotidæ, but in essential structures a typical Lymantriid.

## STÆTHERINIA CORYDONA Druce (Fig. 65)

*Tarchon corydona* Dr. Biol. Centr.-Am. Lep. Het. ii, 445, 88: 8 ♀, 1897.

Also *figured:* Seitz 74: g3 ♀.



Brown, with rather fine darker ordinary lines, and black and white st. points; the white in the points toward apex very conspicuous in a couple of dark specimens, and all but the black element of the st. dots obscure in three light ones. Hind wing deep ochre yellow (unlike *S. cayugana*, with its contrasty var. *valstana*), with two vague brown st. spots in the present series, typically lacking. Female as usual much larger with more pointed wings.

Common (see diagram, p. 245), males only. Chiriquí (Schaus).

Ab. *tarchona* Schs. (Seitz p. 553), with hind wing suffused with red-brown, was described from Panama (Fairchild), doubtless from Barro Colorado Id.

### DESMOLOMA Felder

Fore wing with crowded venation, the male apparently with three simple veins representing the radial system, the first arising out of Sc. Hind wing with a large costal lobe, covering sex-scaling. Antenna with simple tip (unusual in the Lymantriidæ), only the pectinate part arcuate. Tympanum deep and far back, nodular sclerite massive; hood large, lower than usual.

A doubtful member of the family, though the plumed fore legs are normal and key characters agree.

### DESMOLOMA CHIRONOMUS Dyar

*Mantruda chironomus* Dy., Proc. Ent. Soc. Wash. xii, 83, 1910.

Figured: Seitz 74: g6 ♂, 7 ♀.

Fore wing brown, with green antemedial band, etc. Hind wing white with brown costal third.  $M_3$  and  $Cu_1$  short-stalked.

Jan. 2, 8, May 17 (Fried.), Feb. 12, 16, 26 (A.M.N.H.). Colombia.

Dyar reports *D. erratica* Schs., a small solidly dark species with  $M_3$  and  $Cu_1$  of hind wing connate (Seitz 74: h5).

### NOTODONTIDÆ

Head generally prominent with strong tongue and ocelli, legs strong, generally heavily hairy, at least in male; thorax with tympanum forming the roof rather than the anterior side of its cavity, the supporting sclerites simpler than in the preceding families (Euchromiidae to Lymantriidae). (See Richards, Ent. Am. xiii, 32, 18: 155, 1932).

Fore wing with Cu apparently trifid,  $M_2$  arising near middle of height of cell, or more often toward its upper angle; acc. cell typically present, frequently very long and sometimes reaching more than half way to apex. Hind wing with Sc and R closely parallel over middle part of cell, hardly ever fusing; commonly connected by a short bit of  $R_1$  (the "cross-vein"); R and  $M_1$  most often stalked,  $M_3$  and  $Cu_1$  usually free;  $M_2$  from near middle of end of cell, more or less weak or even absent.

Larva with proleg hooks in a single simple series, much like the Noctuidæ, but with multiple setæ on outer side of prolegs and iv of 7th segment of abdomen much lower than on other segments, almost in line with v; occasionally with fine secondary hair (*Rosema*). Pupa usually showing the trifid Cu on the wing pad, but otherwise much like the Noctuidæ (see Mosher Bull. Ill. St. Lab. N. H. xii (2), 34, 125); in a dense parchment-like cocoon, or more often in the ground.

The best attempt at a classification is that in Packard's "Monograph of the Bombycine Moths", i. The Apatelodinæ should be excluded as having no tympanum, undivided epimera, thin flat-type egg, and larva with biordinal hooks on prolegs; and are related to the Eupterotidæ, Bombycidæ and Lasiocampidæ. In fact one or two of the supposed Eupterotidæ of eastern Asia are Apatelodinæ. The Ichthyurinae (which should be called Melalophinae) are distinct in both larva and imago, and *Rosema* with its stout densely hairy, humped larva and male genitalia with heavy bifid uncus, simple valves and simple last ventral segment must be related to them, though the venation is normal Notodontine. The Cerurinae have the inflated valves and chitinized 8th sternite of the Notodontinae, but differ in the retracted head, with weak tongue and no ocelli, loosely hairy legs, and especially larva with hind legs modified into long stemapods, and hairy lateral lobes of the prothorax. The residue, the Notodontinae and Heterocampinae of Packard should, I believe, be treated as a single subfamily, though they can be separated by the cleft or simple 8th sternite of the male, and have a different habitus both in larva and imago. Workers outside of North America have never recognized the separation, but they can be treated as two tribes, the Neotropical group (*Hemiceras* et al.) with  $M_2$  of the hind wing lost, making a satisfactory third. In synopsis:

MELALOPHINÆ: 8th sternite not specially chitinized, without pockets or modifications; uncus cleft, thick, valves not inflated, without hair-pencil; larva stout, humped, with dense fine hair even on head and bases of tubercles.

*Melalophini*: Radial branches concave toward costa; valves membranous, fan-like; main ventral support of genitalia formed of extensions of valves. Holarctic, extending into the Oriental.

*Rosemini*: Radial branches convex toward costa; valves narrow, chitinated, though with membranous border; main support of genitalia formed of the juxta. Neotropical.

PHALERINÆ: Similar to the Notodontinæ, but larva without humps, with fine dense hair on body only. Male with 8th sternite cleft, with 1 or 2 external pockets; valve with membranous border (like Rosema) but uncus enormous, simple, bearing large basal (scaphium-like) lobes. Old World and Nearctic.

NOTODONTINÆ: Genitalia with simple uncus, the basal lobes normally small, middle part of vinculum developed, valves largely membranous, frequently hollow with an enormous tuft; 8th sternite heavily chitinated. Larva with only simple hair above, frequently humped or even spined, prolegs hairy. *Notodontini*: 8th sternite cleft, larva usually plain or with fleshy humps, and last prolegs usually fairly developed; acc. cell normally less than 1/3 way to apex.

*Calledema* group: Scape with hair longer above, frequently with a plume; fore wing with a raised antemedial scale-ridge or tuft in fold; antennæ simple.

*Nystalea* group: Similar, fore wing smooth.

*Crinodes* group: Third segment of palpus very short, antenna close-scaled above; abdomen more or less elongate in male, the terminal tuft sometimes exaggerated.

*Dasylophia* group: Similar to *Nystalea* group, antennæ pectinate, the pectinations ending abruptly at about half length.

*Symmerista* group: Similar, pectinations decreasing gradually, the scape never with a large plume.

*Notodonta* group: Fore wing with a lobe and tuft on inner margin, antennæ normally simple,  $M_1$  arising from acc. cell beyond middle, upper side of scape close-scaled.

*Heterocampini*: 8th segment entire, sometimes covering a pair of pockets at its posterior border, larva usually plain or with acute bristly humps, in the former case with anal prolegs elongate, with reduced hooks, generally not functional. Acc. cell frequently reaching half way to apex when present.<sup>1</sup>

*Hemiceratini*: Hind wing with  $M_2$  lost, the distance between  $M_1$  and  $M_3$  commonly decreased; larvæ smooth or nearly so with elongate but functional anal legs; otherwise near the Notodontini.

<sup>1</sup> The North American larvæ represent a *Schizura* group with humped and bristled larvæ and a *Heterocampa* group with smooth larvæ (after the first stage) and a tendency for the anal legs to become stemapods. Most of the few known South American larvæ belong to the first group.

CERURINÆ: Similar to the Notodontinæ. Head retracted, with weak tongue and no ocellus, palpi weak and normally hairy; 8th sternite simple or extended in middle; larva with long stemapoda and lateral hairy lobes on prothorax.

*Artificial Key to Genera*

1. Hind tibia with terminal spurs only (in the present species); ocelli absent, head very narrow behind eyes; palpi falling short of front, tongue almost obsolete;  $M_2$  of hind wing arising from cell far above stem of  $M_{1+2}$  in cell, which is distinct; accessory cell very small or absent; antennæ pectinate nearly to tip in both sexes (*Cerurina*).....*Cerura*  
Hind tibia with all spurs; tongue and palpi weak and ocelli obsolete only when antennæ have a long simple tip, accessory cell is normal and  $M_2$  of hind wing lost (*Kaseria*).....2
2. Hind wing with  $M_2$  lost.....3  
Hind wing with  $M_2$  well developed.....10
3. Accessory cell absent,  $R_2$  stalked on  $R_{3-5}$ .....4  
Accessory cell normal (in a single specimen with acc. cell absent but  $R_2$  free).....8
4. Fore wing with  $R_5$  stalked beyond origin of  $R_2$ ; apex squarely truncate; antenna pectinate.....*Colax*  
Fore wing with  $R_2$  stalked beyond  $R_5$ ; apex rounded; antennæ not pectinate.....5
5. Third segment of palpus nearly half as long as second; inner margin of fore wing lobed at middle; no silver.....*Antæa*  
Third segment of palpus short; fore wing not lobed at middle of inner margin; frequently with silver discal spot.....6
6. Fore wing with a large lobe at anal angle; male antenna with an oblique notch across scape and base of shaft above. . .*Rhapigia*  
Fore wing not lobed at anal angle.....7
7. A moderate amount of silver or golden scaling or none; male antenna with notch at base.....*Hapigia*

Fore wing very heavily marked with pale gold on a largely orange base; no notch on male antenna. . . . . *Chliara*

8. Palpi very weak, tongue rudimentary, ocellus absent and back of head narrow as in *Cerura*; eyes very large. . . . . *Kaseria*

Palpi upturned to middle of front or beyond, the tongue functional and ocelli distinct though sometimes covered by the vestiture. . 9

9. Space between  $M_1$  and  $M_3$  at margin of hind wing much broader than the interspaces above and below, as wide as in species with  $M_2$  preserved; costa (in the present species) arched and wing oblong. . . . . *Anita*

Space between  $M_1$  and  $M_3$  no wider than those above and below, the veins strongly convergent to margin. . . . . *Hemiceras*

10. No accessory cell; palpus beak-like with a tuft on tip of second segment. . . . . *Lusura*

Accessory cell present (reduced to a vestige in some *Dicentria*, which have no tuft on second segment of palpus); palpus normally upturned to middle of front. . . . . 11

11. A scale-tuft near middle of inner margin of fore wing. . . . . 12

No such scale tuft (occasionally one at anal angle). . . . . 15

12. Inner margin lobed, the scale-tuft very large. . . . . *Apela*

Inner margin nearly straight, with a small scale-tuft. . . . . 13

13. Very large species (over 50 mm.);  $R_5$  stalked from the tip of the short but well formed acc. cell; hind wing with  $M_2$  arising far above middle of end of cell. . . . . *Naprepa*

Medium species, expanding under 50 mm.;  $R_5$  arising from tip of acc. cell unless it is much reduced and stalked; hind wing with  $M_2$  arising but little above middle of end of cell. . . . . 14

14. Outer margin of fore wing sharply bent at  $M_3$  and deeply scalloped below it. . . . . *Astapa*

Outer margin evenly curved, the scallops only gradually becoming somewhat deeper toward anal angle. . . . . *Dicentria*

15. Fore wing with an antemedial scale-tuft or group of parallel ridges where antemedial line crosses fold, the other raised scaling if present slight.....16  
Fore wing smooth-scaled, or with the raised scaling widely scattered over surface of wing, the ridge in fold if present no stronger than one at end of cell.....18
16. Antemedial tuft in fold longitudinal, fan-like.....*Pentobesa*  
Tuft a transverse ridge or two or three parallel ridges (somewhat fan-like but small and transverse in *C. arema*).....17
17. Hind tibiæ and tarsi close-scaled.....*Elymiotis*  
Hind tibiæ with a long hairy fringe or tuft, the tarsi and spurs normally also tufted in male at least.....*Calledema*
18. Fore wing with  $M_1$  arising from acc. cell definitely beyond its middle, the acc. cell reaching as a rule  $1/3$  way to apex or more.....19  
Fore wing with  $M_1$  arising from basal half of acc. cell or free, occasionally further out when acc. cell is very short (*Nystalea*, *Betola*).....21
19. Collar rising in a high transverse crest; front smooth and palpi short (as in *Rosema*) apex of fore wing rounded-truncate.  
*Canodia*  
Collar not distinctly higher than rest of thorax, palpi longer....20
20. Antennæ in both sexes with pectinations ending abruptly about middle; wings longer; vestiture smooth.....*Lirimiris*  
Antennæ of male with pectinations decreasing gradually in length, simple in female; wings shorter and rounder; palpi with much loose hair.....*Peroara*
21.  $M_3$  and  $Cu_1$  of fore wing stalked, of hind wing connate but carried on an extension of the lower angle of the cell so as to appear stalked; thorax with high crests on tegulæ, abdomen with a larger tuft on 3rd segment and in male with a large fan-like anal tuft (♀ not seen).....our species of *Rincodes*  
Fore wing with  $M_3$  and  $Cu_1$  connate or separate, lower angle of cell of hind wing but little extended, no high crests on thorax and abdominal tufts *normally* confined to basal segments....22

22. Scape of antenna with a dorsal plume; the plume more than twice as high as length of scape, and when not very long evenly sheared off; third segment of palpus  $1/3$  or more as long as width of eye, save in a few species of *Nystalea*. . . . . 23
- Scape of antenna normally dorsally clothed with close scales or with a short raised ridge of normal scales, though frequently with a ventro-anterior plume; third segment of palpus normally short, sometimes hardly visible. Scape of antenna rarely (*Phyllopalpia*, *Kalkoma*) with dorsal hair-scales twice as long as length of scape, but in that case they are extremely loose and divergent. . . . . 31
23. Third segment of palpus much longer than width of eye, almost as long as second; male antenna pectinate half way to apex.  
*Didugua*  
 Third segment of palpus not longer than width of eye, when nearly as long the male antenna simple, ciliate. . . . . 24
24. Male antenna pectinate about half way to apex, then abruptly simple; pattern complex, frequently with special subterminal markings above anal angle. . . . . 25
- Male antenna simple, ciliate or fasciculate. . . . . 26
25.  $R_5$  strongly stalked from apex of acc. cell,  $R_2$  free, from acc. cell. . . . . *Betola*  
 $R_2$  strongly stalked from apex of acc. cell,  $R_5$  more shortly or (normally) free. . . . . *Dasylophia*
26. Male with palpus closely held, the third segment wholly above vertex, female with third segment nearly as long as width of eye and porrect; acc. cell symmetrically triangular, about half its length overlapping discal cell. . . . . *Phedusia*<sup>1</sup>  
 Both sexes with palpus oblique, the third segment continuing the line of the second; acc. cell usually with no more than  $1/3$  its length overlapping discal cell. . . . . 27
27.  $R_5$  arising from stalk of  $R_{3+4}$  well beyond end of acc. cell.  
*Nystalea* (in part)  
 $R_5$  arising very close to or before end of acc. cell. . . . . 28

<sup>1</sup> Female *Lepasta mixta* will run out here; it may be distinguished by the single pale discal lunule.



28. Cu<sub>2</sub> arising from cell about opposite R<sub>1</sub> or before (a very little beyond in *L. mixta*).....*Lepasta*  
Cu<sub>2</sub> arising well beyond origin of R<sub>1</sub>, frequently opposite R<sub>2</sub>...26
29. Apex minutely falcate, R<sub>3</sub> and R<sub>4</sub> forking about 2/3 way from tip of acc. cell to apex; pattern simple, normally with an oblique line to apex; base and inner margin forming a separate pattern-area.....*Strophocerus*  
Apex not falcate; R<sub>3</sub> and R<sub>4</sub> forking about half way between end of acc. cell and apex; pattern usually more complex and of other type.....30
30. Wings ample; third segment of palpus as long as width of eye; M<sub>1</sub> of fore wing connate with acc. cell.....*Bardaxima*  
Wings narrower and oblong; third segment of palpus noticeably shorter than width of eye; M<sub>1</sub> of fore wing from acc. cell.  
*Proelymiotis* and *Nystalea* in part
31. Hind wing with Sc parallel and well separated from anterior side of cell (connected by R<sub>1</sub>), only gradually diverging.....32  
Hind wing with Sc very close to cell on basal third, normally separated by less than its thickness, diverging more abruptly.  
33
32. Hind wing contrastingly marked, normally blackish and buff.  
*Rhuda*  
Hind wing with no contrasting markings.....*Blera*
33. Front of cell of hind wing strongly and regularly arched, Sc closely parallel to it and also arched almost to apex of cell; male antenna with downcurved shaft with long pectinations, Lymantriid like, only about 6 terminal segments simple....*Kalkoma*  
Front of cell of hind wing straight in general course except toward base, Sc more or less sinuous but not arched; male antenna simple, or with a larger number of simple apical segments, the shaft not arched.....34

34. Male antenna pectinate, the pectinations short and very gradually decreasing to a simple apical portion; female palpus with third segment more or less porrect; pattern dominantly diagonal.  
*Phyllopalpia*  
Male antenna pectinate half way, more or less, then abruptly becoming simple.....35  
Male antenna simple, ciliate or fasciculate.....38
35. Palpi barely exceeding front, which is oblique, with smooth vestiture; fore wing with  $R_1$  far out, distinctly beyond  $Cu_2$ , and normally less than twice as far from  $R_2$  as  $R_2$  is from end of cell. Ground even green (fast to moisture).....*Rosema*  
Palpi extending far beyond front or obliquely upturned to middle of face; front strongly bulging, with rougher vestiture; fore wing with  $R_1$  usually arising before  $Cu_2$ , many times as far from  $R_2$  as the latter from  $R_4$ . Pattern complex, the green color when present less bright and fugitive.....36  
Palpi extending far beyond the small *flat* front; acc. cell very large, at least toward base; small slender species.....*Talmeca*
36. Hind wing with Sc and R of hind wing closely parallel for more than  $\frac{3}{4}$  length of cell, abruptly diverging just before end of cell; costa with fringe enlarged; fore wing with  $M_1$  arising from near base of acc. cell.....*Farigia*  
Hind wing with Sc diverging abruptly from front edge of cell at  $\frac{3}{4}$  or before; fore wing usually with  $M_1$  arising at about half length of acc. cell.....37
37. Male hind wing below with oblique sex-scaling toward bases of costa and Cu, the costal fringe much enlarged (larva humped).  
*Malocampa*  
Male hind wing without such special scales below, sometimes with loose shaggy hair; costal fringe various (larvasmooth).*Disphragis*
38. Male antenna with bristles of basal half very long, and the shaft also widened, then abruptly decreasing in length; fore wing cream and red-brown with coarse transverse striation. *Magava*  
Male antenna with a notch at base of shaft, followed by a short fringe of stiff hairs; fore wing gray, normally with a contrasting

- pale base sharply set off, and a double, diffuse more or less punctiform dark pm. line. . . . . *Drugera*
- Fasciculations of male antennæ regular; patterns of various (mostly other) types . . . . . 39
39.  $M_1$  connate with base of acc. cell . . . . . 40  
 $M_1$  arising a little way out on acc. cell . . . . . 42
40. Hind tibia with rough bristly scaling its whole length; fore wing with some raised scaling . . . . . *Tachuda*  
 Hind tibia smooth scaled or with a little rough hair on upper half only; palpus extremely short . . . . . 41
41. Smaller; abdomen of male moderately elongate, with minute terminal tuft; longitudinally streaked . . . . . *Antiopha*  
 Larger; abdomen very long in male, with wide fan-like or bifid tuft; markings transverse . . . . . *Marthula*
42. Very large species, hind tibia close-scaled or nearly so; anal tuft of male of long loose spatulate scales; third segment of palpus well set off, nearly half as long as width of eye; acc. cell relatively short, with about  $\frac{1}{4}$  its length overlapping discal cell. . . . . *Crinodes*  
 Not very large species; hind tibiæ hairy above; anal tuft small or evenly cut off; third segment of palpus shorter, acc. cell longer, very shortly overlapping discal cell . . . . . 43
43. Hind wing with Sc and R closely parallel to  $\frac{3}{4}$  length of cell or beyond; abruptly diverging close to end of cell . . . . . 44  
 Hind wing Sc and R diverging more gradually at about  $\frac{3}{4}$  length of cell . . . . . *Rifargia* and *Disphragis gelduba*
44. Present species with Sc and R widely separated on basal half of cell, enclosing a large humeral cell; fore wings broad and blunt. . . . . *Phastia*  
 Sc only moderately curving away from basal portion of cell, the humeral cell slender, normal; wings narrow, oblong, with marked apex . . . . . *Meragisa*

## SEASONAL RECORD OF BARRO COLORADO ISLAND NOTODONTIDAE &amp;c.

NAME	Month	Jan.				Feb.				Mar.				Apr.				May				June				July				Aug.				Oct.				Nov.				Dec.				Total
	Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4									
C. vinasia					●		●	●	●		●	●	●	○																				●	●	○	●		34							
S. purpurascens		○	○																																	●	●	●	●	12						
St. corydona		○	○			●		○		○	○	●		○			○	○	○										○	○					●	○	●	●	23							
C. marmorea		●	●	○		●	●	●	●	●	●	●	○		○			○	●	●		○	○			...	1		...					○	○	○	●	○	49							
C. arema		○	○			●	○	○	○	○	○	○	○		○							○	○			...	1		...					○	○	○	●	○	47							
C. rufescens						●	○	○	○	○	○	○	○																					○	○	○	○	○	20							
P. xylinoidea						●	○											○																			○	○	39							
N. superciliosa						●	●	●	○	○	○	○	○									○												○					14							
N. lophocera		●	○	○	○	●	○	○	○	○	○	○	○	●	○			○	○	○	○					...	1		...				○	○	○	○	○	○	57							
L. concordens		●	○	○	○	○	○	○	○	○	○	○	○	○	○			○								...	1		...				○	○	○	○	○	○	17							
L. mixta		○	○	○	○	○	○	○	○	○	○	○	○	○	○			○								...	1		...				○	○	○	○	○	○	11							
L. maltha		○	○	○	○	○	○	○	○	○	○	○	○	○	○			○				○	○			...	1		...				○	○	○	○	○	○	50							
T. pachydexius		○	○	○	○	○	○	○	○	○	○	○	○	○	○			○	○			○			...	1		...					○	○	○	○	○	○	51							
T. albosigma		○	○	○		○	○	○		○	○	○		○	○							○												○	○	○	○	○	21							
A. multilinea		○	○	○		○	○	○	○	○	○	○		○	○			○	○															○	○	○	○	○	18							
C. striolata		○				○									●	●																			○	○	○	○	23							
D. guarana						○												○	○																○	○	○	○	18							
Di. argentilinea						○		○		○	○											○													○	○	○	○	12							
A. divisula		○		○		○	○	○	○	○	○	○		○	○																			○	○	○	○	○	25							
A. rufinsula				○		○	○	○	○	○	○	○		○	○																				○	○	○	○	12							
K. muscosula		○				○	○	○	○	○	○	○		○	○																			○	○	○	○	○	22							
D. gelduba						○	○	○	○	○	○	○		○	○																				○	○	○	○	○	22						
D. lama		○				○	○	○	○	○	○	○		○	○																				○	○	○	○	○	26						
D. perplexa		○		○		○	○	○	○	○	○	○		○	○																				○	○	○	○	42							
D. tharis						○								○	○			○	○																○	○	○	○	16							
R. distinguenda						○				○	○	○		○	○			○	○																○	○	○	○	32							
R. apella						○				○	○	○		○	○			○	○																○	○	○	○	39							
M. multilinea		○				○				○	○	○		○	○			○	○																○	○	○	○	17							
Dr. morona		○	○	○		○	○	○	○	○	○	○		○	○							○													○	○	○	○	26							
H. indistans		○	○	○		○	○	○	○	○	○	○		○	○			○	○															○	○	○	○	○	121							
H. plana		○	○	○		○	○	○	○	○	○	○		○	○			○	○															○	○	○	○	○	92							
H. commentica		○	○	○		○	○	○	○	○	○	○		○	○			○	○															○	○	○	○	○	31							
H. plusiata		○	○	○		○	○	○	○	○	○	○		○	○			○	○															○	○	○	○	○	38							
H. colombia		○	○	○		○	○	○	○	○	○	○		○	○																			○	○	○	○	○	83							
H. vecina						○	○	○	○	○	○	○		○	○			○	○															○	○	○	○	○	13							
H. flava						○	○	○	○	○	○	○		○	○			○	○																○	○	○	○	○	21						
H. dentata						○	○	○	○	○	○	○		○	○			○	○																○	○	○	○	○	26						
H. meona		○	○	○		○	○	○	○	○	○	○		○	○			○	○																○	○	○	○	○	23						
H. nigrescens						○				○	○	○		○	○							○													○	○	○	○	11							
H. sparsipennis						○	○	○	○	○	○	○		○	○							○												○	○	○	○	○	34							
H. conspirata						○	○	○	○	○	○	○		○	○			○	○																○	○	○	○	○	9						
H. vinicosta		○	○			○	○			○	○	○		○	○																			○	○	○	○	○	43							
H. subochraceum		○				○	○	○		○	○	○		○	○			○	○						...	1		...						○	○	○	○	○	15							
Ha. curvilinea		○	○	○		○	○	○	○	○	○	○		○	○										...	1		...						○	○	○	○	○	10							
Ha. repandens		○	○			○	○	○	○	○	○	○		○	○			○	○					...	1		...							○	○	○	○	○	51							
Ha. simplex						○	○	○	○	○	○	○		○	○			○	○						...	1		...						○	○	○	○	○	13							
A. juturna						○								○											...	1		...							○	○	○	○	○	25						
C. rara						○																			...	1		...							○	○	○	○	○	10						
Sc. leucophleps		○	○	○		○	○	○		○				○								○												○	○	○	○	○	37							

## Subfamily MELALOPHINÆ

ROSEMA Walker (with *Moresa* Walker)

The genus *Rosema* is generally considered to belong to the Melalophinæ, on account of the larva as described by Stoll and Sepp. In fact it is not close to Melalopha, having a perfectly normal Notodontine venation, a fairly Notodontine head (best matched in *Canodia*) and distinctive type of genitalia, with the uncus of Melalopha, but most other structures either Notodontine or unique. The 8th sternite is lightly chitinized, but faintly to distinctly emarginate, approaching the Notodontinæ.

Front flat, closely and finely scaled, oblique, the palpi hardly exceeding it; antennæ  $\frac{2}{3}$  pectinate. Fore wing typically broad with arched costa; long with oblique outer margin and slight tuft on middle of inner margin in *Moresa*. Larva stout, humped, with elongate but functional prolegs; green, feeding on woody legumes.

1. Fore wing toothed below  $R_4$  and  $M_1$ , and strongly excurved below;  $1R_5$  long-stalked; reniform large, black, a strong contrasting black border, narrow at  $M_3$  and ending abruptly below  $Cu_1$ . *deolis*  
Fore wing with even nearly straight outer margin; no black; reniform a white point;  $R_5$  from apex of accessory cell. . . *zelica*

## ROSEMA DEOLIS Cramer

*Bombyx deolis* Cr. Pap. Exot. i, 59, 36: F, 1775; Stoll in Cr. Pap. Exot. iv, 136, 360: B, 1787, ♀.

Larva: Stoll, Suppl. Cr. Pap. Exot. 76, 16: 6, 1790 (apparently this as *Bombyx nitida*); Sepp Surin. Vlinders iii, 117, 1855.<sup>1</sup>

*R. apicalis* Wlk. List. Lep. Ins. Br. Mus. v, 1169, 1855.

Also figured: Seitz 159: d3 ♂, 4 ♀ (typical) d5 ♂, e1 ♀ (*apicalis* as variety).

The name *apicalis* is identified by "Seitz" with specimens which have exceptionally large black reniforms. The Barro Colorado material is of the variety, but it is not in general local.

Larva with red lateral spots and subdorsal spots,—white on third segment of abdomen, anterior black and posterior white on 4, posterior white on 5, anterior black on 6. Food *Pterocarpus indicus*.

Jan. 27, Feb. 2 (Bts.). Mexico to Amazons.

<sup>1</sup> Möschler in Stett. Ent. Zeit. xxxix, 424, 1879 gives an account of this work (which he dates 1852). The material was largely gathered about 1790 by Governor J. G. Wichers and described by H. J. Scheller, who should possibly be credited with the authorship. So it is not unlikely that Stoll's and Sepp's figures were based on the same specimens; they look remarkably similar.

## ROSEMA ZELICA Stoll (Fig. 30)

*Bombyx zelica* Stoll in Cr. Pap. Exot. Suppl. 73, 16: 2 (*larva*), 2C (*pupa*), 2D (*imago*); Sepp Surin. Vlinders ii, 181, 79 (with larva). c. 1850.

*Rosema dorsalis* Wlk. List Lep. Ins. Br. Mus. v, 1169, 1855.

*R. z. f. minor* Ddt. in Seitz. Macrolep. World vi, 1055, 159: c5, 1934.

Also figured: Seitz 159: b1 (normal), 2, 4 (*dorsalis*).

Type form with thorax all green, var. *dorsalis* with a contrasting brown patch. All from Barro Colorado Id. are of the variety. The type seems very rare, but is in the Nat. Mus. from R. Maroni, French Guiana.

Larva with fine subdorsal yellow or tawny lines and small lateral spots; on *Pterocarpus* (?) (Sepp). Figured by Stoll on pineapple, certainly in error.

Dec. 30–Mar. 6. Ranges in races to Brazil.

## Subfamily NOTODONTINÆ

Characters as in the synopsis (above). The subfamily and its typical tribe are world-wide, the Heterocampini are best known from America, the Hemiceratini purely Neotropical.

## Tribe NOTODONTINI

The typical Notodonta group is Holarctic, but *Apela*, and perhaps *Lusura* and *Peroara* are outliers. The majority of Neotropical species group about *Nystalea*, with simple brush-like antennæ, simple fore wings, and a strong tendency to develop a plume on the base of the antenna. The genera of this group are very closely related and tend to intergrade.

CALLEDEMA Butler (with *Pseudantiora* Kirby, *Antiora*†)

M<sub>1</sub> arising from before middle of acc. cell, frequently near base; M<sub>2</sub> from upper angle of cell or near it, R<sub>2</sub> sometimes shortly stalked; antennal plume rudimentary in the type species, otherwise long; hind leg with tarsi and spurs tufted as well as tibia except in *C. arema*.

Each species has distinctive structures, but there is no special cleavage at the point where Schaus separates *Calledema* and *Pseudantiora*.

† Double dagger to indicate *misuse* of name.

1. Fore wing with a silver dash beyond cell, along lower edge of  $M_2$ ; terminal space crossed by diagonal white lines (representing the adterminal line); ground dark. . . . . 2  
Two oblique silver stripes in antemedial region and conspicuous brilliant bronzy areas. . . . . *Lysana plusiata*  
Fore wing without silver postmedial or antemedial stripes; terminal area without oblique lines; ground pale with dark oblique shade and st. spot. . . . . 3
2. Silver bar thick, free at basal end; a smaller species with dorsal plume on antenna and hind tarsus close-scaled. . . . . *arema*  
Silver bar fine, connected to an oblique white patch at middle of costa; no dorsal plume; male hind tarsus with hairy tufts. . . . . *marmorea*
3. A thick brown-black bar from costa near base over  $M_3$  and  $Cu_1$  to margin; ground yellowish. . . . . *contingata*  
This bar thin and shading into the ground below, defined only on upper side. . . . . 4
4. Ground shaded with reddish. . . . . *rufescens*  
Ground light gray. . . . . *jocasta*

#### CALLEDEMA MARMOREA Butler (Fig. 31)

*C. marmorea* Btl. Trans. Ent. Soc. Lond. 1878, 65; Schaus Trans. Ent. Soc. Lond. 1901, 264 (in list only); Dyar Proc. U. S. Nat. Mus. xlvii, 223, 1914. *Figured*; Seitz 143: a1.

(Omitted from Lep. Cat.).

Antennæ with dorsal scaling of scape only about twice as long as ventral, not forming a true plume; fore wing with  $M_1$  and  $M_2$  approximate for a distance near origin, then diverging; hind tarsus with tufts on first two segments. Genotype of *Calledeма*.

Ground mouse gray. *C. sodalis* Btl., described by Butler in the same paper, is almost identical in pattern but has the high tuft and divergent  $M_1$  and  $M_2$  of *Pseudantiora*, also a close-scaled hind tarsus.

Late Nov.—May (see diagram, p. 245). Guatemala to Amazons and Espirito Santo, Brazil.

#### CALLEDEMA AREMA Schaus

*C. arema* Schs. Proc. U. S. Nat. Mus. xxix, 231, 1906.

*Figured*; Seitz 143: a4.

Acc. cell extending almost half way to apex; plume of antenna high;  $M_2$  well below angle of cell; hind tarsus close-scaled.



Small with strongly contrasting silver bar,—without the bronze areas of *L. plusiata*, but with some yellowish silver before the ante-medial tuft.

Feb. 3-June 23 (see diagram). Costa Rica to Guiana (type) and Upper Amazons.

#### CALLEDEMA JOCASTA Schaus

*C. jocasta* Schs. Trans. Ent. Soc. Lond. 1901, 264.

*Figured*: Seitz 143: a5 (head and prothorax should be dark and contrasting).

Plume strong,  $M_2$  from close below angle of cell, diverging; hind tarsus with long hair on basal segments; acc. cell short (as in the following spp.).  $R_2$  usually stalked,  $M_1$  about  $1/3$  way out on acc. cell. Light gray.

Feb. 14, 22 (Weeks, A.M.N.H.) 23 (Bts.) Mar. 3 (Fried.). Guatemala to Rio de Janeiro, common on the Amazon.

#### CALLEDEMA RUFESCENS Schaus

*Pseudantiora rufescens* Schs. Proc. U. S. Nat. Mus. xxix, 235, 1906.

*Figured*: Seitz 144: h6.

$R_2$  short-stalked,  $M_1$  from base of acc. cell. Large, the fore wing decidedly redder below the diagonal line than above.

Dec. to June (see diagram). Guatemala to Guiana and Amazons.

#### CALLEDEMA CONTINGATA Möschler

*Antiora contingata* Msch. Verh. z.-b. Ges. Wien xxxii, 347, 18: 35; 1883.

Also *figured*: Seitz 144: h5.

$R_2$  variable;  $M_1$  from acc. cell at  $1/3$ . This is the genotype of *Pseudantiora*. The brown ruptive pattern on a grayish yellow base is distinctive.

Dec. 31, 1934 (Fried.). Ranges to Guiana and Santa Catharina, Brazil.

Dyar reports *Lysana plusiana* Schs. from the Canal Zone. The antennæ are heavily serrate, plume enormous; it is small, brown, brilliantly marked with lilac gray, copper, and silver lines.

#### ELYMIOTIS Walker

Similar to the preceding genus, but with inconspicuous lichen-like pattern, sometimes with green. Fore wing narrower; plume rudimen-

tary or distinct; acc. cell very short,  $R_5$  stalked;  $M_2$  arising almost  $1/3$  way down on cell; outer margin more erect than in *Pentobesa*, and antemedial tuft narrow, ridge-like. Silver bar of typical *Calledema* represented by a minute Y-mark. (See Fig. 32)

1. *Male* with a black spot in fold, and a series in st. area above the white Y, which is isolated; *female* blackish with only the white Y distinct. . . . . *ancora*  
*Male* without black spots or shades, the Y obviously part of a fine dentate st. line; *female* not seen. . . . . *alata*

#### ELYMIOTIS ANCORA Felder

*Nystalea ancora* Fld. Reise Novara Lep. 97: 8 ♂, 1874.

*Amphipyra purpurascens* Btl. Trans. Ent. Soc. Lond. 1879, 37 ♀.

*Elymiotis attenuata* Schs. Trans. Ent. Soc. Lond. 1901, 272 (in part, not Walker). Also figured: Seitz 144: f3 (♀, as *purpurascens*).

The true *attenuata* has a larger and plainer male, if I have identified it correctly. The National Museum material is sorted differently on characters which I have not recognized.

Jan. 22, May 19 (Bts. Fried.). Amazons. As the National Museum material is sorted "*purpurascens*" will range from Costa Rica to Bolivia.

#### ELYMIOTIS ALATA Druce

*Edema alata* Dr. Proc. Zoöl. Soc. Lond. 1890, 510; Biol. Centr. Am. Lep. Het. 90: 12.

Also figured: Seitz 144: f2.

? *Edema audax* Dr. Ann. Mag. Nat. Hist. (7) vii, 76, 1901.

Fore wing faintly shaded with green. *E. audax* as determined in the National Museum only differs in having no black shade at the tuft of the fore wing.

Oct. 31, 1934 (Bts.). Honduras to French Guiana.

#### PENTOBESA Schaus

Similar to *Calledema* and *Elymiotis*; male antennæ heavily serrate; plume good sized; fore wing rough-scaled; the antemedial tuft fan-like in both sexes; venation of *Elymiotis*, but apex of fore wing rounded over;  $M_2$  arising from middle of end of cell.

I consider this genus monotypic, *P. valta* having none of its distinctive characters. It may perhaps find a place in *Nystalea*.

## PENTOBESA XYLINOIDES Walker (Fig. 33)

*Edema xylinoides* Wlk. List Lep. Ins. Br. Mus. xxxv, 1931, 1866.

*Symmerista pinna* Dr. Biol. Centr.-Am. Lep. Het. i, 239, 25: 9 ♀, 1887.

Also figured: Seitz 144: b4 ♂, 5 ♀.

Fore wing with a complex dead-wood pattern, much paler in female; male with pale greenish tegulæ.

Common (see diagram, p. 245). Mexico to Southern Brazil.

In the following genera the plume is usually present (reduced to a fringe in *Tachuda* and some *Hippia* and *Nystalea*), third segment of palpus long and well set off, and hind tibia with loose hair, often extending onto the tarsus in male. The fore wing is smooth.

## NYSTALEA Guenée

The central genus of the group, in which all species with smooth wings and simple antennæ have been placed which do not belong definitely elsewhere. Plume usually short (long in *superciliosa*), fore wing long with apex typically pointed, but square in the *lophocera* group; acc. cell with  $R_5$  shortly stalked (free in most specimens of *N. lophocera*),  $M_1$  from middle of acc. cell in *N. ebalca*, the genotype, but usually near the base. Larva, according to Seitz, similar to *Noto-donta* (i.e. presumably with fleshy humps on 2 or 3 anterior segments, and a sharper one on 8th abdominal).

1. Fore wing with a black centered ocellate subapical spot; with light reddish spot in end of cell, contrasting with a larger blue-gray shade beyond. . . . . *ocellata*  
No conspicuous black spot near apex of fore wing. . . . . 2
2. Fore wing with outer margin oblique,  $R_5$  strongly stalked, antemedial line converted into practically longitudinal striation. . 3  
Fore wing with outer margin erect toward apex, the subterminal line nearly even and parallel to it; antemedial line but little irregular, somewhat offset on Cu . . . . . 4
3. Plume on antenna short, not distinct from the rest of the fringe on scape; fore wing with subterminal line broken into dots; a pale costo-apical spot, one at middle of costa, and often a black-centered ocellus in fold. . . . . *ebalca*  
Plume high; ground as a rule evenly dark brown; st. line fine, twice as far from margin toward apex as lower down. . . . . *superciliosa*

4. Plume long and conical; larger species, the transverse lines less conspicuous, and adterminal line formed of fine black dots, two to an interspace.....5  
 Plume short and rounded; transverse lines almost completely traceable, double; st. line nearly complete, black, fine, parallel to outer margin.....6
5. Fore wing blackish with contrasting light wood colored costo-apical spot, — the subterminal dots above anal angle emphasized.....*porgana*  
 Fore wing mottled light gray, often brown toward inner margin; st. dots all alike. ....*nyseus*
6. Male with a large plume of oblique hair-scales at  $\frac{3}{4}$  its length; hind tibia with a moderate fringe of long hair, continued almost as wide on base of tarsus; under side of abdomen with much fine erect hair; ante- and postmedial lines not brownish, and not accompanied by brown shading; usually four contrasting blackish spots along fold.....*lophocera*  
 Male with practically simple antenna; hind tibia with a very massive tuft, the tarsus with a few loose hairs at base only; under side of abdomen heavily clothed with extremely long hair; inner t. a. and outer t. p. lines more or less contrastingly dark brown, the upper half of postmedial area shaded with light brown; blackish spots in fold usually only 2 or 3 and not contrasting.  
*plumipes*

#### NYSTALEA OCELLATA Rothschild

*N. ocellata* Roth., Nov. Zoöl. xxiv, 233, 8: 5, 1917.

Also figured: Seitz 143: il.

More warmly colored than the other species; easily separated from all Notodontidae known to me by the black subapical spot, asymmetrically placed in a circular pale patch. Male characters not studied.

Jan. 7 (Fried.) 1 ♀. Guatemala to Guiana and Bolivia.

#### NYSTALEA EBALEA Cramer

*Noctua ebalea* Cr. Pap. Exot. iv, 91, 310: C, 1781.

*Nystalea conchyfera* Guenée, Sp. Gen. Ins. Lep. Het. vi (Noct. ii) 122, 9: 2, 1852.

*Nystalea ebalea* Forbes, Sci. Surv. P. R. xii, 45, 1930.

Also figured: Seitz 143: e3.

Larval food: Gundlach, Contr. Ent. Cubana i, 282, 1881.

The ground may vary from light gray to dark brown, or the inner

edge may be paler; the ocellus in the fold may be single, double or obscure.

Oct. 9, 22 (Bts.) June 25 (Fried.). Antilles, Mexico to southern Brazil.

#### NYSTALEA SUPERCILIOSA Guenée

*N. superciliosa* Gn. Sp. Gen. Lep. Het. vi (Noct. ii) 123, 1852.

*Figured*: Seitz 143: i5.

Nearly plain dark brown, the thorax either concolorous, or cream or buff and contrasting.

Oct. to June (see diagram, p. 245). Mexico to Guiana and S. Brazil.

#### NYSTALEA NYSEUS Cramer

*Noctua nyseus* Cr. Pap. Exot. i, 119, 75: E, 1779.

*Cyrrhesta nyseus* Gundlach, Contr. Ent. Cubana i, 280, 1881.

*Nystalea nyseus* Forbes, Sci. Surv. P. R. xii, 45, 1930.

Also *figured*: Seitz 144: a1.

The ground is very light, flecked with gray, and the dorsum is usually shaded with light brown.

Jan. 30, 1934 (Bts.) July ? (Fairchild, without label). Antilles; Mexico to Guiana and Tucuman. The Fairchild specimen is a very large female without the usual dorsal brown shade.

#### NYSTALEA PORGANA Schaus

*N. porgana* Schs. Proc. U. S. Nat. Mus. xxix, 232, 1906.

*Figured*: Seitz 143: e6.

? *N. difficilis* Draudt, Seitz' Macrolep. World vi, 909, 143: f2, 1932.

The specimens (both females) agree in size with *porgana*,—in the dark color, and the accenting of two adterminal dots above the anal angle, with *difficilis*. Schaus is inclined to consider all one species. Male gray, female blackish in both types, and the distributions overlap.

Dec. 22 (Bts.), June 21 (Fried.). Specimens without the accented dots (*porgana*) are at hand from Guatemala to French Guiana and the middle Amazons, specimens with (*difficilis*), from Costa Rica, Colombia. Guiana and Sta. Catharina, Brazil. It was described from the middle Amazons.

## NYSTALEA PLUMIPES Schaus

*N. plumipes* Schs. Trans. Ent. Soc. Lond. 1901, 268.

(The figure in Seitz, 143: h3 labelled plumipes looks more like *N. longicornis* Felder.)

The light brown varies in amount but appears always visible; the antemedial line is markedly excurved over the costa and cell, unlike *longicornis* (*plumipes* of Seitz). Ground shaded with pale green; a poor specimen from the Amazons darker and browner, perhaps a good race.

Nov. 12-Apr. 5, July ? (Fairchild without label). Ranges to Guiana and the Upper Amazon.

## NYSTALEA LOPHOCERA Dyar (Fig. 38)

*N. lophocera* Dy. Proc. U. S. Nat. Mus. xlvii, 223, 1914.

Not figured.

Larger and paler as a rule than the preceding, with little or no green. The outer spot in the fold is subterminal in *plumipes*, before the pm. line in *lophocera*.

Oct.-June (see diagram, p. 245). Known only from the Canal Zone, unless a bad female in the Nat. Mus. from French Guiana belongs here.

## PHEDOSIA MÖSCHLER

Palpi upturned to vertex with erect third joint in male, oblique, with porrect third joint in female (notably beaklike in an undescribed species in the Nat. Mus.). Acc. cell very short, only about half beyond the cell;  $R_5$  free,  $R_3$  and  $R_4$  stalked half way to apex; R and  $M_1$  of hind wing short stalked (free according to Schaus). A development of *Nystalea*, perhaps nearest *N. ocellata*.

## PHEDOSIA TURBIDA Möschler

*P. turbida* Msch. Verh. z.-b. Ges. Wien xxvii, 691, 10: 49, 1878. ♂

*Proelymiotis apicenotata* Dgn. Ann. Soc. Ent. Belg. lii, 75, 1909.

*Bardaxima hippoides* Schs. Ann. Mag. Nat. Hist. (8) vii, 263, 1911 ♀.

*B. castaneobrunnea* Roth., Nov. Zoöl. xxiv, 234, :4 4, 1917 ♂.

Also figured: Seitz 144: c3 ♂.

Extremely sexually dimorphic. Male smoky gray-brown, with complex pattern, a little green before antemedial line, reniform a double

dark lunule, some st. black dashes and a mottled costo-apical spot; female with the basal lunule of the reniform extended in a black bar, with a white wedge above and beyond it, and apical spot extended in a streak toward the cell.

Jan. 23 ♂ (Fried.), Dec. 23 ♀ (Bts.). Guatemala to Guiana and Amazons.

### PROELYMOTIS Schaus

A derivative of *Nystalea*, and hardly distinct; also very close to *Lepasta*. Plume large; third segment of palpus about  $1/3$  as long as the very thick 2nd; fore wing with  $R_2$  and  $R_5$  from acc. cell,  $M_1$  from base of acc. cell (*joanna*) or connate (*æquipars*);  $M_2$  a third way down. Costa of hind wing straight, but fringed with long hair in *joanna*.

1. Base and subapical spot of fore wing blackish, contrasting with rest of outer half.....*æquipars*  
Ground light gray, with contrasting darker marginal shades and spots.....*joanna*  
Markings more complex, with a small silver st. lunule in cell  $M_3$ .....*lignicolor*

### PROELYMOTIS ÆQUIPARS Walker (Fig. 34)

*Nystalea æquipars* Wlk. List Lep. Ins. Br. Mus. xv, 1742, 1858.

*Proelymiotis æquipars* Schs. Trans. Ent. Soc. Lond. 1901, 273; Forbes, Sci.

Surv. P. R. xii, 46, 1930.

*N. dirisa* Msch. Verh. z.-b. Ges. Wien xxxii, 343, 18: 32, 1883.

Also figured: Seitz 144: g3.

Base dark brown with longitudinal streaking, as in many *Nystaleas*, outer part mottled pale gray.

July-Aug. (Fairchild). Cuba and Porto Rico, South America generally.

### PROELYMOTIS JOANNA Schaus

*P. joanna* Schs. Proc. U. S. Nat. Mus. xxix, 234, 1906.

Figured: Seitz 144: h3.

Male darker than female, the brown inner margin and marginal streak opposite cell not really contrasting. Wings more oblong than in *æquipars*.

Dec. 23, Jan. 29 (Bts.). Guatemala, Guiana, Upper Amazons.



## PROELYMOTIS LIGNICOLOR Möschler

*Dasylophia lignicolor* Möschler, Verh. z.-b. Ges. Wien xxvii, 687, 10: 46, 1877.

*Tifama exusta* Btl. Trans. Ent. Soc. Lond. 1878, 68, 3: 10.

*P. arpia* Schs. Trans. Ent. Soc. Lond. 1901, 273.

Also figured: Seitz 144: h1 (unrecognizable).

Closely similar to the species of *Dasylophia*, and even more to *Betola aroata*, but less contrasting; palpi striped as in *Didugua*; plume high; fore wing brown with complex wood-pattern, partly defined with black; a small st. white lunule in cell  $M_3$ , and white streaks or bars in interspaces above it; inner margin from basal third to anal angle broadly but irregularly ash gray, usually contrasting, but changing to an obscure buff in the faded male type of *arpia* and a male in the Cornell collection.

Oct. 3, Jan. 12, 21, Feb. 2 (Bts.); La Venta (Bts.). Guiana and Brazil.

## BARDAXIMA Walker

Distinguished only by the key characters. A heterogeneous looking genus which is probably not to be kept, but the species agree in the rather broad ample wings. (See Fig. 35)

Schaus credits *Bombyx longara* Stoll (Suppl. Cr. Pap. Exot. 18: 3, 3G) to *Bardaxima*, though the figure looks more like *Elymiotis*. Its larva is slender with large head, dark brown with contrasting whitish flecks and streaks, those on the side oblique. It rests with front of abdomen humped and hind legs raised and feeds on "Cerisier sauvage de Suriname."

## BARDAXIMA PERSES Druce

*Heterocampa perses* Dr. Ann. Mag. Nat. Hist. (7) v, 516, 1900.

*Bardaxima demera* Schs. Trans. Ent. Soc. Lond. 1901, 270.

Figured: Seitz 144: d2.

Large, pale gray, checkered with blackish, the ordinary lines waved and duplicated; adterminal line more regularly waved than usual, interrupted by a luteous apical ocellus with black pupil.

July ? (two females without label from Fairchild, det. Schaus). Guiana and Amazons.

LEPASTA Möschler (*Poresta* Schaus)

Acc. cell narrow, mostly beyond discal cell;  $M_1$  connate or from its basal third,  $R_5$  typically barely stalked,  $M_2$  a third way down the cell

or more, the mdev. strongly oblique in; wing rather narrow, outer margin nearly even, normally emphasized by a group of parallel ad-marginal lines. Plume strong.

1. Fore wing with a silver streak or bar below  $M_2$ ; border formed of about 5 nearly even and parallel lines and shades. . . . . 2  
Fore wing without silvery markings; adterminal line at least, irregular and lunulate. . . . . 3
2. Similar silver bars below 3 alternate veins ( $R_5$ ,  $M_2$ ,  $Cu_1$ ); a distinct, rather paler costal area, reaching across to inner margin at base.

*concordens*

A single silver bar below  $M_2$ , the rest of the wing rather even, striate in a dead wood pattern, partly defined with green. *bractea*

3. Outer third rather evenly olive gray, with a slender lunulate st. line, the postmedial partly white and distant; an irregular pale costal patch and inner third. . . . . *maltha*  
Postmedial far out, irregular and preceded with black shading, the basal 2/3 of wing with wood-like longitudinal shading, st. highly irregular, in a partly gray area. . . . . *mixta*

#### LEPASTA BRACTEA Felder

*Nystalea bractea* Fld. Reise Novara Lep. 97: 3, 1874.

*L. bractea majorina* Dgn. Hét. nouv. Am. Sud. vii, 20, 1914.

*L. gigantea* Roth., Nov. Zoöl. xxiv, 235, 1917.

This is the genotype. The third segment of palpi is exceptionally long. Var. *majorina* (*gigantea*) is a little larger and darker. It was described from Col. and Ecuador, but I have it in series from Sta. Catharina, Brazil, and the typical form from Rio.

Feb. 2, 3 (Bts.—typical). Mexico to S. Brazil.

#### LEPASTA CONCORDENS Dyar

*L. concordens* Dy. Proc. U. S. Nat. Mus. liv, 356, 1919.

Not figured. (Resembles *L. grammodes*, Seitz 145: f2).

*L. conspicua* Btl. is rather smaller, and the white st. line is in contact with the following black one, while in *concordens* they are separated by a gray line. Third segment of palpus more than half as long as second.

Oct.-Jan. (see diagram, p. 245). Mexico to S. Brazil. (See Fig. 36)

## LEPASTA MIXTA Möschler

*L. mixta* Msch. Verh. z.-b. Ges. Wien xxxii, 349, 18: 37, 1883.

*Nystalea calophasioides* Kaye, Trans. Ent. Soc. Lond. 1901, 137, 5: 2.

Also figured: Seitz 144: k6.

M<sub>1</sub> hardly stalked on acc. cell, which is shorter than in the other species. Fore wing with the dead-wood pattern more contrasty than *L. bractea*, on a yellow ground, but none of the specimens seen are as yellow as Seitz's figure.

Nov.-May (see diagram). Ranges to Guiana and Upper Amazons.

## LEPASTA MALTHA Schaus

*L. maltha* Schs. Proc. U. S. Nat. Mus. xxix, 239, 1906.

Figured: Seitz 145: f4.

Pale gray with brown (somewhat olive) areas and markings partly defined with pure white. Barro Colorado specimens correspond to Seitz's figure, and are larger and less bright than a set from Guiana.

Late Oct. to June (see diagram, p. 245). Guatemala to Surinam.

STROPHOCERUS Möschler (*Poresta* Schaus in part, not type)

Like *Lepasta*, the fore wing more triangular, with more acute apex; R<sub>3</sub> and R<sub>4</sub> longer stalked, forking two thirds way from end of accessory cell to apex. Markings distinctive, usually solid brown, with a contrasting gray band on inner margin and an oblique postmedial band or shade from near middle of inner margin to apex. (See Fig. 37)

1. Fore wing with pale striation, the discolorous inner margin narrow, wholly below A, not contrasting, with a white spot above it at base..... *albonotatus*

Fore wing with brown ground even; inner margin pale powdery gray, contrasting, extending across to base of costa, with a silver lunule above it on outer margin..... *punctulum*

## STROPHOCERUS ALBONOTATUS Druce

*Poresta albonotata* Dr. Ann. Mag. Nat. Hist. (8) iii, 466, 1909.

Figured: Seitz 145: e1.

More orange than the following, the hind wing tawny, nearly concolorous. Antennal plume massive.

Oct. 31, Dec. 26 (Bts.). Guatemala to Guiana and Bolivia.

## STROPHOCERUS PUNCTULUM Schaus

*Poresta punctulum* Schs. Ann. Mag. Nat. Hist. (8) vii, 264, 1911.

*Figured*: Seitz 145, e2.

Hind wing fuscous. Too close to *S. thermesia* Fld., Reise Novara 97: 9.

Jan. 3 (Bts.), Feb. 24, May 6 (Fried.), Honduras (Bts.), Costa Rica (type). Ranges to Guiana and the Amazons, a pale race from Southern Brazil.

TACHUDA Schaus (*Naduna* Schaus)

Fringe on upper side of scape much reduced, narrower than on inner and lower sides, dominated by the tuft on vertex, but recognizable (unlike the *Crinodes* group). Accessory cell very short, about half overlapping the discal cell;  $M_1$  free. Vestiture of head shorter than in most of the preceding genera, but with a distinct median ridge. Palpi closely upturned to vertex, third segment  $1/3$  as long as second, but well set off. The species are closely similar, dark with fairly complete but not contrasting markings, narrow wings and usually some pale or bronzy green. They are universally misidentified. In the four Panama species the ground is fuscous brown, usually shaded with green, the transverse lines, waved, multiple, and mostly inconspicuous; the antemedial and subbasal well out, usually triple; postmedial of two pairs of lines, the inner pair cut or marked by a tawny spot opposite cell, the subterminal irregular, several of its teeth usually accented by blackish shades, the adterminal of a series of black dots, 1 to 3 of which at the costa are accompanied by yellow dots; reniform a raised black bar with a white dot at each end.

1. Outer pair of pm. lines nearly erect, covered by a blackish band which starts just beyond them at the costa, and then covers them nearly or quite to inner margin; inner t.p. lines erect at inner margin, and preceded by a contrasting whitish line; median area glossy, blue-green, narrow; the base coal black as a rule, obscuring the subbasal lines. 8th sternite with lobes very close together and simple, the left much longer. . . . . *discreta*

All four pm. lines obscure and parallel, strongly oblique in to inner margin when traceable; the median area all clear green and brown, without whitish before pm. or at most a small spot opposite cell; subbasal line as distinct as the others. . . . . 2

2. Outer postmedial more or less shaded with black and contrasting on upper half, with a black st. spot beyond it below  $M_3$ ; left lobe of 8th sternite broad and blunt, separated by rather more than its width from the narrow right lobe. . . . . *pachydeixius*  
Outer postmedial without any blackish shading, the whole ground of the wing without contrasts, rather evenly brown and green or wholly brown or blackish. . . . . 2
3. A distinct outer pm. dot above  $M_3$ ; blackish border of under side of hind wing narrow, less than a third as wide as length of wing; left lobe of eighth sternite narrow and close to right lobe, but with a broad hump on its outer side. . . . . *punctum*  
Pm. without any contrasts at all; border of under side of hind wing extending nearly half way to base; 8th sternite symmetrical, with two widely separated triangular lobes. . . . . *albosigma*

#### TACHUDA DISCRETA Schaus

*Tachuda discreta* Schs. Proc. U. S. Nat. Mus. xxix, 241, 1906.

Not figured.

The original description included the following species, but the holotype is the present, which was the form primarily intended by Schaus. The wings are broader than in the other species, especially in the female. (Fig. 15, male genitalia.)

Nov.-Dec. (fresh females), Jan. 31, Feb. 3 (very bad males). Ranges to Guiana and southern Brazil.

#### TACHUDA PACHYDEXIUS, new species (Fig. 41)

*T. discreta* Schaus, Proc. U. S. Nat. Mus. xxix, 241, 1906 (in part, not type).

Figured: Seitz 145: f5 ♂ (as *albosigma* in error).

Similar to *T. albosigma* Druce. Last sternite (fig. 17) with terminal portion tapering to a little more than a third its width, gradually and evenly on left side, more abruptly and somewhat less on right; end with two free chitinated lobes, the left one bluntly rounded over or squarish, about as wide as long, the right one half as wide, and separated by a squarish notch a little wider than the left lobe. Uncus on a long extension of the tegumen (like *discreta*, unlike *albosigma*) with a large high membranous longitudinal keel above; membrane of outer half of valve triangular, tapering to apex, — unlike *discreta* where it is twice as wide near apex as at base; striations of lining of pocket in basal half

curving back on themselves at apex (converging in a radiate way in *discreta*).

Dull brown (the same color as the other species), shaded with slightly glossy green, decidedly in costal area and cell toward base, and quite strongly in median area over forkings of veins from upper and lower angles of cell and broadly over A; basal line waved, triple, dark, a little emphasized on veins, nearly erect; antemedial triple at costa, strongly excurved, and its outer line fine, black and continuous to A, where it is retracted and marked by a blackish dot; inner lines fading out below costa; pm. line with first pair of lines distinct, oblique out from costa to opposite lower angle of cell, the first fine below costa, the second red-brown opposite cell, and lying on a pale tawny spot, obscure and parallel to outer margin from there to inner margin; outer lines of t.p. parallel, mostly obscure, but covered by a black shade which starts from a diffuse dark gray patch extending to apex, becomes a definite fascia opposite cell and fades out about at Cu<sub>1</sub>, thence the lines inwardly oblique (when traceable) to inner margin; st. of three or four small blackish shades, three at costa and a larger one in a pale shade below M<sub>3</sub>, adterminal dots as usual, the first one with a pale yellow dot before it and the next one or two with minute yellow points. Hind wing dull luteous, the outer half deep gray-brown, without definite boundary; fringe contrasting dull white (as usual). Head and collar typically black-brown above, varying to dull luteous, especially in female. Abdomen, legs and palpi as in the other species.

Barro Colorado Id., Panama, Oct. 20, 1934, (Bates) and about 50 paratypes in M. C. Z., American Museum of Natural History and Cornell University (see diagram, p. 245); paratypes St. Laurent, Maroni, French Guiana and Viçosa, Minas Geraes, Brazil, June 4, 1931 (Hambleton) in Cornell University.

Female slightly shorter-winged than male, the green of median area perhaps a little stronger toward inner margin, but not as noticeably as in *T. albosigma*. For dates in Panama see diagram.

#### TACHUDA ALBOSIGMA Druce

*Lochnæus albosigma* Dr. Biol. Centr. Am. i, 236, 1887, ii, 457, 90: 17, 1898.

Also figured: Seitz 145: gl (as *discreta*).

? *T. nefanda* Draudt in Seitz Macrolep. World vi, 928, 145: f6, 1932.

The male is like Seitz' figure of *nefanda*, the female well represented by his figure of "*discreta*" which looks like a copy of Druce's *albosigma*. The principal difference is the much more conspicuous green of the

usual female, especially on the middle of the inner margin. There is a well marked variety without green, and one in the Barro Colorado lot with the black shade-dots much emphasized, especially along the st. line. Its genitalia agree with normal *albosigma* (fig. 18).

Not rare (see diagram, p. 245). Ranges north to Mexico (*nefanda*), the southern range not certain, from confusion with other species.

#### TACHUDA PUNCTUM, new species

Last sternite (fig. 16) broadly rounded over, almost in a semi-circle, with two small subequal lobes at middle of end, with a small deep notch between them. Uncus on an extended tegumen, not as long as in *T. pachydexius*, but much longer than in *T. albosigma*; dorsal prominence very small and densely hairy; valve with essential structures of *T. pachydexius*, the plates more numerous (about 50) and basal ventral sclerite more convex at middle.

Externally almost exactly like *T. albosigma*, the usual lines almost wholly reduced to vein points (like the least marked specimens of the two preceding); but a single contrasting black dot above  $M_3$  marking the outer t.p. Hind wing above like the other species, below with a moderate brown border, only extending about  $1/3$  way in to base, or a little less; the usual dark pm. line only indicated by a short costal bar at  $3/5$ , with a wide space between it and the outer dark shade.

Lancetilla, Tela, Honduras, May 5, 1935 (Bates) type in M. C. Z.; Barro Colorado Id., Panama, Nov. 24, 1934 (Bates) paratype retained for Cornell University; both males. The female may possibly be confused with *T. albosigma*.

The three following genera form a subgroup distinguished from the *Nystalea* group by the closer scaling of legs, front and scape above, and very short third segment of palpus; *Tachuda* is transitional, as the genitalia show. *Crinodes* is an extreme development, but obviously connected to *Marthula*, one species of which even has the loose terminal tuft of the abdomen. It looks like a Sphinx.

#### ANTIOPHA Schaus

Acc. cell rather short,  $R_5$  barely stalked,  $M_1$  from near its base;  $M_2$  from well above middle of cell. Terminal tuft of male long, truncate, somewhat divided, much like the more generalized (typical) species of *Marthula*. Pattern distinctive, of heavy dark vein-lines, the one on



M<sub>2</sub> weaker, and fine lines in interspaces, the ordinary lines represented by a few pale dots.

ANTIOPHA MULTILINEA Schaus (Fig. 39)

*A. multilinea* Schs. Trans. Ent. Soc. Lond. 1901, 275, 11: 3.

Also figured: Seitz 144: i8.

The black is dominant over the brown, forming a dead wood effect. Common, Oct.-Apr. (see diagram, p. 245). Guatemala to S. Brazil.

MARTHULA Walker (*Crinodes* in part)

Larger species than the last, the abdomen and terminal tuft of *male* longer, but varying from species to species, the terminal tuft in our species simple or forked, without loose spatulate hairs. Front as smooth as *Roseina*, but with a slight central keel, and palpi upturned to middle of front; acc. cell moderate, about 1/3 overlapping cell, R<sub>5</sub> connate from its tip, M<sub>1</sub> from its base. Pattern usually of fine transverse lines, with subbasal and medial as well as the usual lines. (See Fig. 40)

MARTHULA RUFESCENS Schaus

*M. rufescens* Schs. Ann. Mag. Nat. Hist. (8) vi, 576, 1910.

Not figured.

Brown; a darker shade before postmedial line; subterminal of a series of blackish shade-spots; hind wing brown in male and brown-tinted in female, unlike *M. quadrata*.

Dec. 24 (Bts.) Jan. 24 (Fried.) two females. Costa Rica (type), also a doubtful female seen from Guiana.

CRINODES Herrich-Schäffer

Head as in the last two genera; fore wing with fork of R<sub>3</sub> and R<sub>4</sub> very short, M<sub>2</sub> from middle of end of cell, but mdcv exceptionally oblique; Cu<sub>2</sub> arising from cell before R<sub>1</sub> (unusual in the family). Abdomen of male long and conical, Sphinx like, with a long loose terminal tuft (unlike the related genera, which have the tuft sheared off squarely or forked), female normal. A very distinctive genus, much like *Tarsolepis* in the Old World, but the latter has a silver pattern suggestive of *Lepasta*, and sometimes pectinate antennæ. The species are close, and probably best separated by the course of the t.p. line.

1. Postmedial line strong, excurved in fold, double, dark; black dash in discal fold accompanied by a distinct pale shade below it; scaling smooth.....*besckei*  
Postmedial line when distinct not strongly excurved in fold, frequently fading out below.....2
2. Fore wing with slightly raised transverse striation, visible with grazing lighting, most distinct from end of cell well toward margin; postmedial line diffuse and distinct toward costa only, where it may have a faint continuous pale dividing shade.  
*striolata*  
Fore wing smooth-scaled, the dark postmedial area with faint striation in some specimens of *ritsemæ*. . . . . 3
3. Browner, postmedial and subterminal lines marked by mixed black and deep yellow dots, usually only toward costa; black streak beyond cell to near outer margin heavily dusted with deep yellow.....*schausi*  
Grayer; postmedial line marked by paler yellowish points on veins (sometimes absent), the single narrow blackish line which is parallel to it on inner side more distinct than in *schausi*.  
*ritsemæ*

#### CRINODES BESCKEI Hübner

*Crino besckei* Hbn. Samml. Exot. Schm. ii, 194: 1, 2 (♂ only) 1823.

*Crino dissimilis* Grt. Trans. Am. Ent. Soc. iii, 183, 1870.

Also figured: Biol. 92: 4 (as *ritsemæ*); Seitz 145: d1 ♂, b2 ♀.

June 5 (Fried.), Lancetilla, Honduras (Bts.). Mexico to Brazil. Specimens from west Mexico and Cuba are a distinct small race with base of hind wings much paler (*dissimilis*).

#### CRINODES RITSEMÆ Butler

*Crino besckei* Hbn. Samml. Exot. Schm. ii, 194: 3, 4, (♀ only) 1823.

*Crinodes ritsemæ* Btl. Ann. Mag. Nat. Hist. (5) ii, 172, 1878.

Also figured: Biol. 92: 7 (as *abscondens* Walker in error); Seitz 145: b3.

In this species the ren. is thick, erect, with a central black pupil, which occasionally almost fills it, the p.m. broad and blackish, more than half beyond the series of pale vein-dots and preceded by a second narrow line; in the North American *C. biedermanni*, the p.m. is fine, scalloped, its teeth meeting traces of the yellow dots, and in one of our specimens immediately followed by a brown band; the ren. connects with the pale costal stripe. (See Fig. 29)

May 24 (Fried.), a rubbed and nearly immaculate female, but apparently of this species. Lancetilla, Honduras (Bts.). Ranges to Brazil.

#### CRINODES SCHAUSI INTERMEDIA Draudt

[*Crinodes schausi* Roth., Nov. Zoöl. xxiv, 235, 1917; Seitz 145: c2.]

*C. s.* var. *intermedia* Ddt. Seitz. Macrolep. World, vi, 925, 145: d5, 1932.

Larger and much darker and warmer brown than *ritsemæ* (typical *schausi* not so); blackish markings more or less suffused with deep yellow dusting, especially band beyond cell; discal bar strongly oblique, linear, shaded with yellow dusting, not in a regular pale spot, hind wing deeper; the under side usually with a dark pm. shade running from opposite cell nearly to anal angle. A specimen from Venezuela has a more erect ren. but may be distinct (the st. spots being wholly dark, etc.).

Nov. 3, Feb. 3 (Bts.). Mexico to Southern Brazil.

#### CRINODES STRIOLATA Schaus

*C. striolata* Schs. Trans. Ent. Soc. Lond. 1901, 277.

*C. s.* var. *fuscipennis* Roth., Nov. Zoöl. xxiv, 235, 1917.

*C. s.* var. *insularis* Roth., Nov. Zoöl. xxiv, 235, 1917.

The moth varies in shade of color and distinctness of pattern, the t.p. being sometimes distinctly sinuous, and partly double toward costa, sometimes with almost all markings (except the pale base) obsolete. *Fuscipennis* was based on relatively plain specimens; var. *insularis*, if I have it named correctly, is more distinct and much like *C. ritsemæ*.

Common in first half of May (see diagram, p. 245). Costa Rica to Pernambuco and Peru; var. *fuscipennis* with the type, var. *insularis* in Venezuela and Trinidad.

#### DASYLOPHIA Packard (*Hatima* Walker)

The three following genera are closely related, and probably directly ancestral to the *Nystalea* group; — except for the 3/5 pectinate antennæ they hardly differ from *Lepasta*, and *Proelymiotis lignicolor* is really a *Dasylophia* even in pattern. Third segment of palpus about 1/3 second (unlike *Didugua*),  $M_1$  arising from base of acc. cell or free,  $R_5$  at about half total length of acc. cell or before (unlike *Betola*).

Most of the species have the subterminal and adterminal lines rather close together, with the cells  $M_3$  and  $Cu_1$  more or less filled with black between them, sometimes forming ocelli.

Known larvæ on Leguminosæ, but *D. thyatiroides* also reported from Hickory. The few described larvæ smooth, with a slightly raised shining black subdorsal spot on the side of first segment of abdomen and a dorsal one on 8th.

1. Postmedial line distinct, running in a broad curve from near costa to  $Cu_2$ , then bent in and enclosing a black spot in fold. . . . . *guarana*  
Postmedial line when distinct erect or a little oblique out above  $M_3$ , — from  $Cu_1$  to middle of fold straight and strongly oblique in, sometimes only indicated by a following brown bar or obsolescent. . . . . 2
2. Males; antennæ broadly pectinate on basal 3/5; frenulum simple (*maxtla* not recognized). . . . . 3  
Females; antennæ simple or pectinate narrowly at base, frenulum multiple. . . . . 4
3. Lighter, commonly with fine striation beyond postmedial line; typically with a black streak in cell and basal dash just below  $Cu$ . . . . . *terrena*  
Postmedial area more heavily suffused with red-brown; the whole effect darker. . . . . *xylinata*
4. Antennæ simple; ground suffused with black brown, leaving the basal area contrastingly pale; postmedial line fine when distinct or marked by dots on veins, retracted on veins  $M_1$  and  $M_2$ , the area beyond it with two dark streaks to a cell. . . . . *terrena*  
Antennæ shortly pectinate at base; base of fore wing not contrastingly pale; postmedial diffuse, generally evenly excurved opposite cell, the streaks beyond it more diffuse and somewhat oblique when distinct. . . . . 5
5. Pale, the only conspicuous marking a brown oblique dash along dorsal part of postmedial; tegulæ all of the pale color (with fine center line at most). . . . . *maxtla*  
Heavily shaded with red-brown, somewhat defining the pale basal patch of *D. terrena*; tegulæ with inner half red-brown. . . *xylinata*

#### DASYLOPHIA GUARANA Schaus (Fig. 42)

*Oedemasia guarana* Schs. Proc. Zoöl. Soc. 1892, 331.

Figured: Seitz 146: b5 ♂.

Female much larger and coarser, with the general appearance of *terrena* (146: d3) but the finer pattern of the male. I found only males in Guiana, but the present series are all female but one.

Flight scattering (see diagram, p. 245). Mexico to South Brazil, the southern (typical) specimens slightly variant.

#### DASYLOPHIA TERRENA Schaus

*Oedemasia terrena* Schs. Proc. Zoöl. Soc. 1892, 331.

*Notodonta dars* Dr. Ann. Mag. Nat. Hist. (6) xiii, 356, 1894.

Figured: Seitz 146: d3 ♀.<sup>1</sup>

Male light wood brown, striate, one of the two specimens from B.C. Id. without the usual stronger streaks, and somewhat darker except for the outer margin. Female much larger and heavier, very distinct in the blackish shading on center of wings and inner half of tegulæ.

Females Nov. 22-Mar. 3; only two males: Jan. 10 (fresh), May 6 (rubbed). Mexico.

#### [DASYLOPHIA XYLINATA Walker

*Nystalea xylinata* Wlk. List Lep. Ins. Br. Mus. xxxiii, 759, 1865.

*Notodonta* (?) *pythia* Dr. Ann. Mag. Nat. Hist. (6) xiii, 346, 1894.

Also figured: Biol. 90: 7 ♀, Seitz 146: c7 ♂, d1 ♀.

If the sexes are correctly associated the male of this is darker than *terrena*, though the female is lighter, but both agree in the less definite striation beyond the t.p. line.

All the specimens taken on Barro Colorado Id. are of the following, which I suspect is merely a color form.

Lancetilla, Tela, Honduras (Bts.). Mexico to Brazil.]

#### DASYLOPHIA MAXTLA Schaus

*Oedemasia maxtla* Schs. Proc. Zoöl. Soc. Lond. 1892, 331.

Figured: Seitz 146: d2.

Very near the last; perhaps a pale color form.

Jan. 26-May 2. Mexico.

<sup>1</sup> The figure of *terrena* ♂ in the Biologia, 90:6, is much darker than *terrena* as determined in the National Museum and accepted here, and is the male credited to *xylinata* in Seitz.

## BETOLA Schaus

Very near the last, though with  $M_1$  arising farther out. Pattern homogeneous, similar to *Proclymiotis lignicolor*. Mixed gray, clay color and brown, the most conspicuous features four or five short oblique black-brown bars.

## BETOLA AROATA Schaus (Fig. 43)

*B. aroata* Schs. Trans. Ent. Soc. Lond. 1901, 290, 11: 6.

Also figured: Seitz 148: f2.

Male hind wing almost wholly translucent white, female shaded with fuscous.

Nov. 22-May 6. Also seen from Venezuela and Guiana; more southern records apparently belong to a related species.

## DIDUGUA Druce

Similar to *Dasylophia*; third segment of palpus much longer, more than half as long as second.

## DIDUGUA ARGENTILINEA Druce (Fig. 44)

*D. argentilinea* Dr. Biol. Centr. Am. Lep. Het. i, 483, 40: 13 ♀.

Also figured: Seitz 146: a5.

Wood brown, middle of wing darker, two triangular silver spots, sometimes connected; adterminal line fine, even and black.

In the closely related *D. leona* Dr. the adt. line is broken and the moth larger and darker.

Chief flight at end of Jan. (see diagram, p. 245). Southwest U. S. to Venezuela.

LUSURA Walker (*Tifama* Walker)

No accessory cell;  $R_2$  stalked beyond  $R_5$ ,  $M_1$  free,  $M_2$  below middle of cell. Palpi beak-like, the second segment with a larger triangular tuft below, third short; antemedial line marked by a series of small raised tufts; pectinations of male antenna ending abruptly at  $3/5$ . Hind tibia nearly smooth scaled. (See Fig. 45)

Larva smooth, with five fleshy cylindrical middorsal processes, grouped three and two (Stoll, Sepp).

A curious genus, perhaps derived from somewhere between *Nystalea* and *Dasylophia*; female much larger than male and differently marked.

## LUSURA ALTRIX Stoll

*Bombyx altrix* Stoll in Cr. Pap. Exot. iv, 36, 307: E, 1782.

Also figured: Fld. Reise Novara Lep. 98: 6 ♂ (as *Chatognatha*); Seitz 154: a1.

Male with all-over pattern, with a contrasting yellow subapical patch at costa (not shown in Seitz' figure), and disc of hind wing white. Female dark brown, terminal area lighter; with black streaks in base of fold and through end of cell, and usually an irregular light terminal area; hind wing dark.

Feb. 3 ♂ (Bts.), Mar. 30 ♀ (Fried.). Guiana and Amazons.

The next two genera agree in having two-thirds pectinate antenna and long rather truncate fore wings with relatively small hind wings; they are probably somewhat related to *Dasylophia*, and the second apparently leads over into *Rosema*.

## LIRIMIRIS Walker

Antennæ broadly and stiffly pectinate to 2/3 in both sexes. Front with massive rough scaling, but no tufts or ridges, palpi hardly upturned to middle of front, 3 short; antennæ without distinct plume. Acc. cell rather long,  $M_1$  beyond middle,  $R_5$  stalked,  $M_2$  at middle of cell or below; Sc of hind wing usually diverging from cell before middle.

1. Inner half of fore wing only slightly darker than costal half, costal edge contrastingly dark. . . . . 2  
     Inner half of fore wing contrasting, dark brown, the boundary faintly deflected by reniform. . . . . *truncata*
2. Tip of abdomen contrasting, yellow in male, yellow or whitish in female. . . . . *auriflua*  
     Tip of abdomen concolorous gray. . . . . *lignitecta*

## LIRIMIRIS LIGNITECTA Walker (Fig. 46)

*L. lignitecta* Wlk. List Lep. Ins. Br. Mus. xxxii, 469, 1865.

Figured: Biol. 91: 20; Seitz 147: d5 ♂, e3 ♀.

Ground mottled in two shades of pale gray; ordinary spots large and faint; t. space dark-filled. Hind wing largely white.

May 24 (Fried.). Guerrero, Mexico to southern Brazil, the latter the slight race *arpi* Ddt.



## LIRIMIRIS AURIFLUA Draudt

*L. auriflua* Ddt. in Seitz Macrolep. World vi, 943, 147: f2, 1932.

Averages a little smaller and paler, but differs definitely only in the contrasting pale tail.

May 22 (Fried.). Lancetilla, Honduras (Bts.). Guatemala, Costa Rica and Lino, Panama (Nat. Mus.). Peru and Brazil (types).

## LIRIMIRIS TRUNCATA Herrich-Schäffer

*Drymonia truncata* H.-S. Aussereur. Schm. 66, fig. 494, 1856.

Also figured: Seitz 147: f4 ♂, 3 ♀.

There is a fine pale double terminal line on all wings.

Nov. 22, Feb. 3, May 25. Ranges north to Mexico.

CANODIA Guenée (with *Drastoma* Schaus)

Head smooth and palpi hardly exceeding front as in *Rosema*; fore wing long, with truncate apex and  $Cu_2$  arising rather beyond  $R_1$ . Collar erect, ridge-like. Color dull olive, easily fading (unlike *Rosema*) to dull red-brown. Markings complete, with a basal as well as double ante- and postmedial lines, and a large reniform.

## CANODIA DIFFORMIS Herrich-Schäffer

*C. difformis* H.-S. Samml. Aussereur. Schm. 67, fig. 132, 1854.

? *C. carmelitoides* Gn. Sp. Gen. Ins. Lep. Het. vi (Noct. ii) 378, 12: 8, 1852.

Also figured: Seitz 157: d5 ♂, 4 ♀.

In the original figures *carmelitoides* was figured with single ordinary lines and *difformis* with strongly double ones, but commonly, as in the present specimen, there are two strongly unequal lines. Possibly the names can be kept for slight northern and southern races.

Mar. 17 (A.M.N.H.). Ranges south to Brazil.

## PHYLLOPALPIA Draudt

Antennæ narrow, gradually tapering to a simple apex, as in the North American (and also Neotropical) *Symmerista*; acc. cell short,  $M_1$  free,  $R_5$  barely stalked; palpus with 3 half as long as 2. Pattern suggestive of *Lepasta maltha*. Probably related to *Symmerista* and rather ancestral to the *Nystalea* complex.

## PHYLLOPALPIA MARCELLA Schaus

♀ *Antiopha marcella* Schs. Ann. Mag. Nat. Hist. (8) vii, 615, 1911.

♂ *Antiopha pittieri* Schs. Proc. U. S. Nat. Mus. lxxv (7) 57, 1924.

♂ *Phyllopalpia triangulum* Draudt in Seitz Macrolep. World i, 929, 147: a4, 1932.

Clay color, with a large irregular black-brown V, edged above and before with shining cream white, and with minor marks; when fresh with some olive tint. Schaus thinks the name *triangulum* can be kept for a southern race, but if so the difference is slight.

Jan. 31, 1935, 1 ♀ (Bts.). Costa Rica (type *marcella*), Venezuela (type *pittieri*); Guatemala and Paraguay (U.S.N.M.) *P. triangulum* was described merely from "South America."

## PEROARA Schaus

Antennæ with pectinations very gradually lessening to a simple apex; palpus with 3 long, but nearly buried in the loose hair of 2; front with a medial keel-like tuft; abdomen without any tuft. Acc. cell short, but lying mostly beyond discal,  $M_1$  arising beyond its middle,  $R_5$  stalked,  $M_2$  from well above middle of end of cell.

A rather isolated genus; the appearance and hairiness suggest North Temperate genera of the Notodonta group.

## PEROARA DISCOVATA Schaus (Fig. 47)

*P. discovata* Schs. Proc. U. S. Nat. Mus. lxxix, 385, 1922.

Not figured (resembles *P. sylvestris* and *caterina*, Seitz 148: g1, 2).

Ash gray; reniform a white comma with dark center; st. line conspicuous, waved, whitish, preceded by blackish separate wedges (united in *P. sylvestris*), which are conspicuous except opposite cell.

Apr. 29-May 2 (Fried.). Guatemala to Colombia. *P. sylvestris* ranges from Colombia to Pernambuco, *P. caterina* is in southern Brazil.

## APELA Walker

Vestiture of front and palpi nearly smooth, as in *Rosema*, *Canodia*, etc., mid and hind tibiae more or less hairy, the mid-tibia with sextufts in some species; male antenna simple, fasciculate. Fore wing broad, with a lobe and scale-tuft on middle of inner margin, longest in *A. neobule* and *acutidivisa*;  $R_5$  long-stalked from the short acc. cell,  $M_1$  arising



5. Fore wing with median area distinctly darkened, contrasting a little with antemedial area and outer third. . . . . *divisula*  
Fore wing with ground even or generally darkened to costa. . . . . 6
6. Antemedial line rather even, excurved, extending almost straight across the submedian space. . . . . 7  
Antemedial line scalloped, deeply retracted at middle of submedian space, or reduced to black and white dots on veins. . . . . 8  
Antemedial line not traceable, or indicated by one or two very faint white dots; postmedial very faint, dark, followed by paler; wings blunt and squarish. . . . . *ascma*
7. Wings narrower, lobe at inner margin (including tuft) smaller, nearly isosceles; ground darker and duller; ante- and postmedial lines sometimes defined finely with white. . . . . *archimma*  
Wings broader, lobe on inner margin stronger, very prominent, the basal side of tuft cut off almost at right angles to general line of margin; ground of male rather warmer brown, of female umber brown. . . . . *rufinsulæ*
8. Postmedial line followed by a distinct *even* paler defining line or shade, not defined by white points, or with one or two toward costa only, antemedial usually complete. . . . . *strigatula*<sup>1</sup>  
Postmedial line without a distinct following shade, but defined by a more or less complete set of mixed black and white points on veins; antemedial also mostly indicated by black and white points on veins. . . . . *punctilla*

*Synopsis of eighth sternites (male)*

1. Terminal notch about as wide as the lobe on either side or narrower, rounded at bottom; base of 8th sternite with slightly extended angles only. . . . . 2  
Terminal notch much wider than the lobes on either side, which are often pointed, or else membranous, with a V-shaped notch; base of 8th sternite with a pair of long hollow extensions. . . . . 5
2. Notch much deeper than wide, ending in a deep pocket. . . . . *ascma*  
Notch about as deep as wide. . . . . 3
3. Side lobes squarely truncate. . . . . 4  
Side lobes symmetrically extended at middle in a blunt point. . . . . *neobule*  
Side lobes distinctly furthest extended at edges of notch, sloping back to sides (notch either rounded or V-shaped). . . . . *divisula*

<sup>1</sup> This may possibly be the male of *A. strigata* Mösch., described from two females.

4. Sides of notch convergent, notch smaller. . . . . *acutidivisa*  
Base of notch curved in a circle, notch larger. . . . . *lilacina*
5. Notch V-shaped with rounded bottom and chitinized free edge. .6  
Notch with a sharp V-shaped bottom and convex nearly membranous edges. . . . . 7  
Notch with rounded concave sides as a whole, at the bottom extended with a chitinized thickening. . . . . *cataphæa*
6. Notch rather wider at mouth than deep, flaring. . . . . *archimma*  
Notch much deeper than wide at mouth. . . . . *rufinsulæ*
7. Base of notch simple or with a slight slit. . . . . *strigatula*  
Base of notch extended with a short slight keel. . . . . *punctilla*

*Natural Key to Species (Primarily Genitalic)*

1. Lower lobe of inner keel of valve in the form of a short transverse ridge; penis with a heavily chitinized outer plate; 8th sternite without tubular extensions at base, with a small rounded notch at apex (*Group I*). . . . . 2  
Lower lobe of inner keel of valve rudimentary, either a membranous flange or a small nodule, the upper lobe frequently large; penis not chitinized in outer side (except *A. rufinsulæ*); 8th sternite with a pair of tubular extensions of base, the apical notch large but chitinized and rounded at bottom (*Group II*). . . . . 6  
Lower lobe of inner keel of valve large and thin, erect; the upper lobe rudimentary or absent; penis with a small weak chitinization on outer side; 8th sternite with outer margin membranous or nearly so, of two convex halves, meeting in an acute angle; tubular extensions present. Uncus inflated (*Group III*). . . . . 8
2. Uncus thick at tip; species with rather distinctive patterns (see first key); upper lobe of valve triangular, half way between lower lobe and apex. . . . . 3  
Uncus thin at tip; plain brown species, with the usual lines and spots only, often inconspicuous; upper lobe of valve close to lower or absent. . . . . 5
3. Lower lobe of inner keel a third way from hinge to apex; penis with a moderate outer flange and acute cornutus. . . . . 4  
Lower lobe half way to apex; penis with a very large inflated outer flange and a rounded cornutus. . . . . *neobule*
4. Cornutus a regular rose-thorn, with expanded base; ventral side of uncus not expanded at base; moth buff with olive line.

*acutidivisa*

- Cornutus a mere nodule; ventral side of uncus distinctly expanded at base; moth brown and brassy. . . . . *lilacina*
5. Upper lobe of valve triangular, close to lower; penis with two cornuti and an outer spine. . . . . *asema*
- Upper lobe of valve absent; penis with outer chitinization only, no cornuti. . . . . *divisula*
6. Uncus thin at base and broadly expanded at tip (square) as in Group III; tip of valve with a special terminal transverse keel, not quite reaching inner edge; both lobes of valve high and thin, parallel but offset from each other, the outer a high triangle, the basal weak and rounded; penis with two large, simple, lightly chitinized cornuti. . . . . *cataphæa*
- Uncus broadly expanded below at base, with normal narrow tip; tip of valve rounded over, with the edge corresponding to the transverse ridge of the preceding, curving back and faintly joining the outer tooth of valve; lower tooth a small nodule, lying in front of a broad membranous flap that reaches to base of valve. . . . . 7
7. Penis lightly chitinized on outer side, the cornutus a very large terminal spine; outer lobe of valve sharply triangular. . . . . *archimma*
- Penis with a heavy outer chitinization, ending in a lateral spine; cornutus a rose thorn; outer lobe of valve rounded over. *rufinsula*
8. Uncus diamond-shaped; inner lobe of valve represented by the abrupt ending of a long membranous fold extending to base of valve, outer lobe obsolete. . . . . *strigatula*
- Uncus hexagonal; inner lobe of valve a large oblique triangle, rounded at tip and concave on outer side, not connected to base; outer lobe represented by a distinct oblique chitinous ridge. . . . . *punctilla*

### Group I

#### APELA NEOBULE Druce

? *Apela divisa* Walker, List Lep. Ins. Br. Mus. v, 1093, 1855; Hmps. Fauna Br. India Moths i, 168, fig. 104 (♀ and venation).

*Maschane neobule* Dr. Ann. Mag. Nat. Hist. (7) xiii, 250, 1905.

Also figured: 154: c6 ♀, 5 ♂ (as *lilacina*).

Female with ordinary spots faint as a rule, and no shade beyond the faintly duplicated pm. line; male with a whitish shade toward costa and distinct orb. and ren, dark and close together, but no spot below the cell; inner marginal lobe very long and the wing shaded with fuscous about its base. (Fig. 19, male genitalia.)

I think this is the true *divisa* as figured by Hampson from Walker's type, but as the type is female and the name has usually been applied to a mixture of the brown species, I am not using the name.

Nov. 29, Jan. 8 (Bts.), Mar. 18 (Wood-A.M.N.H.), May 4-7 (Fried.), Lancetilla, Honduras (Bts.). Costa Rica (type). Further distribution unknown from confusion with other species, especially *A. divisula*. *A. divisa* was described from Nepal, in error.

[APELA PICTURATA Dognin

*A. picturata* Dgn. Hét. nouv. Am. Sud. xii, 13, 1916.

The type in the U. S. National Museum shows a very distinct chocolate brown species with contrasting pure white lines; and long inner lobe on fore wing. Genitalia not examined.

St. Jean, Maroni, French Guiana.]

[APELA ACUTIDIVISA Rothschild

*A. acutidivisa* Roth., Nov. Zoöl. xxiv, 262, 6: 12, 1917.

Study based on two males from Moengo, Surinam and Mouth of R. Teffé, Upper Amazons, determined by Schaus. (Fig. 20, male genitalia). Described from French Guiana.]

[APELA LILACINA Dognin

*A. lilacina* Dgn. Hét. Nouv. Am. Sud. xxxii, 14, 1923.

(Not *A. lilacina* Seitz 154: c5, which I believe is male *neobule*).

Study based on specimens from Moengo, Surinam, and Remate de Malos, R. Javary, E. Peru, (Fig. 21, male genitalia) compared with Dognin's type from French Guiana.]

APELA DIVISULA, new species

*Apela divisa* Seitz 154: 3 ♂, 4 ♀? (not *divisa* Walker).

*A. neobule* in part of U. S. National Museum.

Male genitalia as given in key and figure 22; mid tibia with some loose hair, without sex-scaling.

Light red-brown, the usual color for the genus; front of collar, head, including palpi, upper part of breast and fore legs a little warmer brown, under side otherwise pale. Upper edges of collar and tegulae



and posterior tuft of thorax, also tuft of fore wing powdery, largely of mixed black and white scaling. Fore wing with median area somewhat darker, especially toward costa in female, antemedial area distinctly paler, often somewhat contrasting, outer third somewhat paler, more or less shaded with dark gray, somewhat less yellowish; tuft on inner margin long, but shorter than in *A. neobule*; lines fine, single, distinct; subbasal excurved and somewhat waved; antemedial evenly excurved to A, then abruptly offset in and vertical to inner margin, sometimes with black and white scales on veins; postmedial straight from apex to outer side of lobe on inner margin; blackish, conspicuous, the outer part sometimes with a coaly lustre (corresponding to the olive line of *A. acutidivisa*); ordinary spots close together, of somewhat blurred vertical ellipses, the ren. higher as usual; usually with a smaller horizontal ellipse (suborbicular) below cell, forming a triangle; two or three adterminal dots below middle of wing normally present. Fringe somewhat darker. Under side of fore wing a lighter reddish buff, with contrasting dark brown fringe, the hind wing cream, much paler. Female much like male, larger, duller.

Barro Colorado Id., C. Z., Panama, Oct. 25 to June 23; type and numerous paratypes in M. C. Z. and A.M.N.H., also deposited in Cornell University (see diagram, p. 163). Mackenzie and Tumatumari, British Guiana, Moengo, Surinam, Fyzabad, Trinidad, Mouth of R. Teffé, Codajos and Rio Tajapurú, Amazons, in Cornell University; also from Nova Bremen and Jaraguá, Santa Catherina, Brazil in Cornell and coll. Franclemont. Females from Manãos, Amazons, Brazil are put here doubtfully, but the females (4) from B.C. Id. may be trusted, the confusion species being apparently absent.

[APELA ASEMA, new species

Similar to the preceding except for genitalic structures indicated above (fig. 23) and the following points: ground of head, thorax and fore wing evenly red-brown, without the warmer and darker shades; the powdery black and white areas at the same places but reduced, inconspicuous; fore wing without white costo-apical dots; basal line lost, t.a. of faint white dots on veins only; t.p. a fine whitish line, with a faint dark shade before it, strengthened on veins, and interrupted between; straight to outer edge of the anal lobe, which is strong, but wider than high. Under side like preceding; mid tibia with a mass of curving fine hair-scales, appearing considerably thickened.

Manãos, Brazil, Sept. 7-9, 1920, 1 male holotype in Cornell University collection.]

### Group II

#### APELA RUFINSULÆ, new species

*A. divisa* of U. S. Nat. Mus. in large part. (Not *divisa* Wlk.)

Male genitalia as given in keys and figure 25, on the whole of generalized type, but the ventral base of the uncus the widest of any species studied, almost as wide as dorsal base, and the hollow basal extensions of the 8th sternite so curved on inner side as to enclose almost a perfect circle. Mid tibia with a fringe of stiff pale hairscales on inner side.

Red-brown, the head, front of breast, thorax, etc., concolorous with no black frosting, and only exceedingly fine white scale-tips; outer third rather paler beyond the pm. line, but antemedial region concolorous, the median area darkening noticeably to costa and apex slightly so. Basal and antemedial lines simple, dark, excurved and waved, nearly parallel, the am. retracted below A but not offset, running to base of lobe; pm. from apex to outer edge of lobe, continuous, dark, followed merely by a narrow pale shade, marked by 2 or 3 white dots on veins toward costa but with no costo-apical white dots. Two black adterminal dots in cells  $M_2$  and  $M_3$ . Under side like *divisula*. Female similar to male, but much darker umber brown, shading into blackish, making the very fine white frosting more distinct.

La Venta, Anton, Panama, Jan. 24 (Bts.), holotype ♂; Barro Colorado Id., Panama, one male and numerous female paratypes, chief flight in Feb. (see diagram, p. 245). Holotype and paratypes in M. C. Z. Paratypes also in A.M.N.H. and C.U. Not recognized from elsewhere, but probably wide-spread under the name of "*divisa*."

#### [APELA ARCHIMMA Schaus (Fig. 48)]

*A. archimma* Schs. Proc. U. S. Nat. Mus. lxxiii (19) 54, 1928.

Mr. Heinrich has kindly compared the male genitalia (fig. 26) with the type in the U. S. National Museum. Only one of my specimens has the white ante- and postmedial lines. The species varies a good deal in color, but is long-winged and usually has a velvety look. I have not recognized the female.

Guiana and Amazons (type).]

## [APELA CATAPHÆA, new species]

Structures almost intermediate between Groups II and III (fig. 24), the high square uncus being unique, but similar to that of the latter. Under side of hind wing covered with sex-scaling, concolorous brown, unlike anything else in the genus; very woolly at base of cell; mid tibia somewhat thickened with shaggy hair, but less than in *asema*.

General appearance remarkably like *A. asema*. Fore wing squarish looking. Red brown, very even but with upper edge of tegulæ and disc of thorax as well as edge of wing-tuft strongly powdered black and white; head and thorax otherwise concolorous with whole of wing. Antemedial and subbasal line excurved and waved when visible, practically obsolete in type; pm. line as usual from apex to outer edge of lobe, reduced to black and white dots on veins; all three lines rather strong and blackish in male paratype. Under side hardly paler than upper, the fringe hardly darker. Female similar to male type, nearly immaculate; the under side of hind wing a little lighter, but very much darker than in the remaining species.

Tumatumari, British Guiana, June 29, 1927, (at light), (male type), June 28 (paratypes ♂ and ♀) in coll. Cornell University.]

*Group III*

## [APELA STRIGATULA, new species]

This species and the following are very close, as shown by both appearance and genitalia, but are sharply separated on the different shaped uncus and lobes on the keel of the valve (fig. 27).

Red-brown, without any distinct contrasts of tint; the edge of collar and rear of thorax with white-tipped fuscous scales. Basal line irregular and incomplete, antemedial when complete regularly dentate and excurved, often reduced to black and white dots on the veins; postmedial straight, a clear dark line followed by a pale one, without white dots on veins, but frequently with two white dots just below costal margin; fringe hardly darker, under side as in *divisula*. Mid tibia with a broad brush of stiff hair-scales in under side, and an oblique mass of closely applied hair-scales on inner side. Female not certainly identified.

San Paulo, Olivença, Amazons, Feb. 20, 1920 (H. S. Parish) type; Iquitos, Peru, Mouth of R. Teffe, Matura, below Codajos, east of Fonte Boa, and Manãos, Amazons, Brazil; Tumatumari, British

Guiana, all paratypes male in Cornell University. The Codajos specimen is very pale but has normal genitalia.]

[APELA PUNCTILLA, new species

Possibly *A. strigata* Mösch. Verh. z.-b. Ges. Wien xxvii, 683, 10: 41, 1878.

Genitalia (fig. 28) exactly like the preceding, except that the expansion of the uncus is rounded-hexagonal, with rounded apex, tapering base, and parallel vertical sides; outer lobe of valve a distinct long-oblique chitimized ridge; inner lobe undercut on distal side, sharply cut off at base, higher than wide, and not connected with base of valve; edges of lobes of 8th sternite fused for a short distance at base in a chitimized spur, showing in the intact specimen as a short ridge.

Moth brown, almost identical with the preceding; except for the series of white points along the pm. line in all specimens examined. Tibia apparently as in the preceding.

Mackenzie, British Guiana, June 21-24, 1927, type and several paratypes male; Tumatumari, B. G. June 28, 1 paratype.]

Tribe HETEROCAMPINI

This type has only been recognized in the North American fauna, but is present in South America where even the typical genus (*Disphragis*-*Heterocampa*) is strongly developed, and also invades the Palaearctic. *Fentonia* as represented there is commonly associated with our "*F.*" *marthesia*, a highly specialized form, but the larva (Marumo, Jour. Coll. Agr. I. Univ. Tokyo, vi, 314, 23: 27, 1920) is obviously very near *Dicentria* and *Schizura*. *Stauropus* is also by the larval stemapods unquestionably a *Heterocampin*, but *Egonocia* (*Desmeocræra*), which looks like *Heterocampa*, has a primitive *Notodontine* larva. By the larva the European *Exæreta*, *Hoplitis*, *Pterostoma*, *Lophopteryx* and possibly *Spatalia* should also be included.

The genera may be discussed in four arbitrary groups, though knowledge of the larvæ will certainly result in a different arrangement:

*Dicentria*: A small scale-tuft at middle of inner margin (except the North American *Schizura*); acc. cell usually rather short,  $M_1$  from well before its middle;  $R_5$  frequently stalked from apex; larva with humps topped with tufts of bristles (*Dicentria*, *Schizura*) or transverse ridges (*Naprepa*).

*Hyparpax*: Wings simple, wide and rounded, vestiture fluffy; antenna pectinate almost to apex; tongue weak; larva (*Hyparpax*) as in the preceding.

*Disphragis (Heterocampa)*: Antenna pectinate to half or two-thirds, ending abruptly; acc. cell usually reaching half way to apex, with  $M_1$  arising from its middle and  $R_5$  near its tip; larva as before or smooth with baby larva only spined; tongue generally strong.

*Rifargia*: Similar, antenna simple, fasciculate; larva unknown.

### Group I

#### DICENTRIA Herrich-Schäffer (*Ianassa* Walker)

Pectinations of male antennæ ending just beyond middle; head with loose hair on vertex; fore wing with acc. cell typically reaching about  $1/3$  way to apex; tending to be reduced, in the present specimen reduced to a minute trace at origin of  $M_1$ ;  $R_5$  then stalked beyond  $R_2$ ; Hind wing with Sc and R well separated along cell, gradually diverging before end of cell.

Larva in *D. lignicolor* with a strong bristly hump on 1st segment of abdomen as well as thorax and 8th segment, the thorax contrasting green, in the present species with enlarged peg-like spines (see the species).

#### DICENTRIA VIOLASCENS Herrich-Schäffer (Fig. 49)

*Oligocentria violascens* H.-S. Samml. Aussereur. Schm. 11, fig. 385, 1885.

*Rifargia brunneipennis* Kaye, Proc. Zoöl. Soc. 1922, 992, 1: 11.

Also figured: Biol. 91: 11 ♂, 12 ♀ (as *Phya phraortes*); Seitz 149: c4 ♂.

Strongly dimorphic, with about the coloring of the North American *Schizura concinna*, which the larva also resembles. Male light wood brown, strongly streaked, the anal black and white spot weak; female deep purple brown, with the anal spot contrasting. I found the species common in Guiana, but every male was rubbed.

Larva stippled, black on yellow, with red subdorsal tubercles, bearing thick black-tipped pegs; large and forked on first segment of abdomen, paired on 2 to 6, the one on 5 large and on 6 small, then a high pair on 8. Head cream and black, legs red.

Feb. 21 (Fried.), 1 ♀. Mexico to Amazons.

## ASTAPA Dognin

Like the preceding, the wings broad and outer margin of fore wing sharply bent at  $M_3$ . For some unknown reason the Lep. Cat. separates this from *Dicentria* by fifty pages.

## ASTAPA VIRIDIFUSCA Schaus

*Odontosia* (?) *viridifusca* Schs. Proc. U. S. Nat. Mus. xxix, 278, 1906; Seitz Macrolep. World vi, 1018, 1933.

Not figured.

Shaded dark olive and deep red-brown, with a contrasting white dot above  $Cu_2$  at margin; ordinary lines double, dark, lighter-filled, not contrasting. Hind wing blackish.

Dec. 23, 1934 (Bts.). 1 ♀. British Guiana (type).

## NAPREPA Walker

Similar to *Dicentria*; the acc. cell relatively shorter. Very large species, expanding from 60 mm. up; male antennæ merely fasciculate, vertex without a tuft; fore wing with outer margin scalloped;  $R_5$  generally stalked;  $M_1$  well before middle of acc. cell; hind wing with Sc and R joined by a strong cross-vein, but well separated, and diverging gradually from middle of cell. Larva, see the species.

## NAPREPA HOULA Dyar

*N. houla* Dy. Proc. U. S. Nat. Mus. xxxviii, 257, 1911.

*N. fusconubilata* Roth., Nov. Zoöl. xxiv, 231, 5: 7, 1917.

Also figured: Seitz 154: e3.

Fore wing with ground evenly dark brown, with deadwood pattern; pm. black, bent in a series of extremely deep loops opposite cell, giving a striate effect. Expanse over 100 mm.

Larva in U. S. Nat. Mus., smooth except light raised transverse ridges on abdominal segments 1, 6, 8, (suggesting *Raphia*), these ridges evenly curved, from front of segment on sides to back on dorsum, the first two red, defined with white behind, the third black and defined with white in front; also marked with large ocelli with red centers and fine brown rings: a lateral series in thorax, weak on 1st segment of abdomen, three on second, a transverse series with a lateral one behind

on each of next three segments and 3 each on 6 and 7, besides one on each leg plate. Described from an inflation. The ground color now buff, doubtless green in life.

May 22, 1935 (Fried.), 1 ♀. Mexico to Venezuela.

## Group II

### KALKOMA Schaus

Antennæ plumose, head fluffy, palpi rather short, with rudimentary tongue, even weaker than in *Hyparpax*, legs fluffy, with fore tarsi tufted on outer side, the whole effect strongly Lymantriid. Fore wing with long acc. cell, but  $M_1$  arising near its base; hind wing with costa strongly arched, and even R along cell strongly arched, parallel to Sc.

This genus is more extensive than indicated by Draudt etc., and must include "*Salluca*" *psittica*, *ruptilinea*, *virens* and *psitticula*. The following species is very small; all the other species seen except *pylaon* and *virens* differ in having a triple postmedial line; the type *virens* shows black beyond the t.p. and a black spot at base of cell; *pylaon* is much larger, with black on st. line at both margins. I have seen only one female of this genus, the type of *K. psittica* Schs.

### KALKOMA MUSCOSULA, new species (Fig. 50)

Pale gray-green, the color on most of fore wing made up of a mixture of olive, white and a few black scales. Head white, tinted with pale olive; the front and lower half of antennal tuft more solidly pale olive; shaft of antennæ light brown; palpi white, with a broad black stripe on outer side, running over onto the upper side on second segment, but not on third. Fore legs white and pale olive with a broad band on front, shading from red brown on femur and tibia to black-brown on tarsus; under side and mid and hind legs buff. Abdomen mixed olive and light brown above, light buff below (easily becoming greasy). Thorax above with red-brown scales on upper half, partly white-tipped, base white, disc with a band of scales in front with blackish bases. Fore wing lighter toward costa (with more white scales). Ordinary lines darker, grayish; subbasal of a few gray dots, white-filled at costa; antemedial double, broken, waved, somewhat oblique to inner margin; postmedial double, waved, offset out on costa, incurved at cell and fold, somewhat excurved between, white-filled above



inner margin; median simple, dark, starting directly below first spot of pm. line below costa, then not offset but otherwise parallel to pm. to inner margin; (not appearing like a third line of postmedial as in some other species). St. of a couple of dark shades at costa and inner margin, followed by white spots; adt. fine, blackish, irregularly doubly dentate between veins and broken, reduced at costa to a single dot in  $R_3$ . Ante- and postmedial lines each marked by two contrasting black dots on costa. Hind wing light red-brown, somewhat paler at base. Expanse 32 mm., being the smallest species of the genus.

Barro Colorado Id., Panama, type Nov. 8, 1934 (Bates) and numerous paratypes, Oct. to June (see diagram, p. 245). Female unknown. The National Museum also has this species from Panama, and a male, apparently identical, from the Rio Xingú, Brazil.

### Group III

#### MALOCAMPA Schaus

Antenna pectinate only to  $2/3$ ; fore wing with  $M_1$  arising from acc. cell near middle;  $R_2$  and  $R_5$  free at tip;  $M_2$  high; hind wing with Sc diverging sharply from cell far before end. A slightly heterogeneous genus, intermediate between the Dicentria group and the Heterocampa group. Malocampa leans toward Group IV, the following Farigia is nearer to Disphragis.

1. Fore wing gray with a blackish patch over end of cell, and ordinary lines more or less marked with contrasting black dots; the sub-terminal series alternating with the terminal. . . . . *punctata*  
Fore wing dull gray without conspicuous light or dark markings.

*Disphragis satis* and *matralis*

- Fore wing whitish, the markings and disc of thorax dark brown, contrasting, but tegulae whitish. . . . . *puella*  
Fore wing light gray brown with whitish anal patch. . . . . *sida*

#### MALOCAMPA PUNCTATA ILLIMIS Draudt

[*Bombyx punctata* Cr. Pap. Exot. iv, 36, 307: F, 1782.]

[*Malocampa punctata* Schs. Ann. Carnegie Mus. xv, 4: 19, 1923.]

[*Bombyx ziliante* Stoll in Cr. Pap. Exot. iv, 191, 384: C, 1782.]

[*Bombyx bifurcata* Sepp, Surin. Vlind. i, 33, 13, 1830 (with larva and pupa).]

*M. p.* form *illimis* Ddt. in Seitz Macrolep. World vi, 982, 151: b6, 1932.

All the specimens are of the race or form *illimis*, which is much smaller and the ground lighter than in typical specimens from Guiana.

Larva of *M. punctata* (Sepp) with high humps on first and 8th segments of abdomen, each bearing a pair of bristles (as in *Schizura unicornis* from the U. S.); green with a brown saddle marking, extending far down on sides of 3 and 6, where it ends in white spots. On "melk-houtboom."

Feb. 3 (Bts.), Mar. 2, 27, Apr. 3 (Fried.). Described from Mexico. The type form ranges from Surinam to southern Brazil at least.

#### MALOCAMPA SIDA Schaus

*Blera sida* Schs. Proc. Zool. Soc. 1892, 333.

*M. sidoides* Schs. Trans. Ent. Soc. Lond. 1901, 208.

*M. canescens* Dgn. Ann. Soc. Ent. Belge lii, 171, 1908.

The synonymy is according to Schaus. The type of *canescens* is illegible, but the placing is reasonable.

Jan. 24 (Fried.), Feb. 6 (Bts.). Cuba and Mexico to southern Brazil and Paraguay.

#### MALOCAMPA PUELLA Dyar (Fig 51)

*M. puella* Dy. Proc. Ent. Soc. Wash. ix, 45, 1908.

Figured; Seitz 151: c6.

After studying the material in the U. S. Nat. Mus. I should separate the species of the *puella* group as follows:

1. Veins whitish in postmedial region, cut with blackish normally contrasting ..... *argentata*  
Veins concolorous ..... 2
2. Blackish border of inner margin broadening more or less at middle, normally forming a conspicuous patch, which in typical *puella* reaches up to a median dash in fold ..... 3  
Blackish on inner margin most emphasized at anal angle, never broad ..... 4
3. Ground grayer; with ordinary lines more or less distinctly pale; under side of hind wing with border dark gray, strongly contrasting, and frequently reaching nearly or quite in to end of cell. (South America) ..... *piratica*  
Ground almost white, the usual lines not distinctly pale; under side of hind wing with border pale gray, hardly reaching half way in to end of cell. (Central America) ..... *puella*

4. Light gray, with at least the narrow reniform and postmedial line contrasting white. . . . . *albolineata*

Practically white, with no paler contrasts. . . . . *bolivari*

I am inclined to consider *puella* merely a northern race of *piratica*.

Jan. 4-Feb. 3 (Bts.), Lancetilla, Honduras (Bts.). Mexico to Venezuela, replaced by *piratica* Schs. in Guiana to Brazil.

#### MALOCAMPA PUELLA, ab. MEXICANA Draudt

*M. albolineata* form *mexicana* Ddt. in Seitz Macrolep. World vi, 983, 151: d2, 1932.

Blackish spot on middle of inner margin rudimentary or absent. I believe this is a form of *puella* rather than *albolineata* if the original figure is at all accurate.

Feb. 27 (Fried.), 1 ♀, transitional. Described from Mexico.

#### FARIGIA Schaus

Intermediate between *Malocampa* and *Disphragis*.  $M_1$  arising near base of acc. cell; wings more or less marked with green;  $M_2$  arising only a little above middle of cell; hind wing with Sc parallel to cell almost to apex, then abruptly diverging. (See Fig. 52)

#### FARIGIA PALLIDA Schaus

*Lophodonta* (?) *pallida* Schs. Proc. Zoöl. Soc. 1894, 242.

Not figured.

♂ Gray, shaded with green, especially on ordinary lines, which are inconspicuous; thorax and a pm. spot on f.w. contrastingly whitish. ♀ with outer third mostly white, but heavily gray shaded beyond pm. line except opposite cell; base shaded and mottled with gray and lines filled with green more distinctly than in male. *F. catherinæ* Dgn. is similar, but the male hind wing is white.

Nov. 24, Dec. 7, 30, 3 ♂'s (Bts.); June 17 (Fried.). Guatemala to southern Brazil.

#### DISPHRAGIS Hübner (*Heterocampa* Doubleday,

*Scirodonta* Grote and Robinson, *Cecrita* Walker, etc.)

Moth not always distinguishable from *Malocampa*, frequently but not always with straighter costa of hind wing, without the fringe of

long hair-scales. Larva smooth in last stage, with anal legs lengthened and raised, sometimes almost forming stemapods; first stage typically with black spines, the ones on prothorax often antler-like. The species with broad fringed costa like *Malocampa* usually have more or less green coloring.

I am placing *gelduba* here, following Draudt. While the male antenna is almost simple, it still shows rudiments of pectinations, and they stop rather abruptly toward the middle of the antenna. The pattern is also perfectly "Heterocampine" and not at all like normal species of *Rifargia*.

### Males

1. Hind wing dominantly white; tufts on meso- and metathorax and first segment of abdomen massive, formed of curled, more or less metallic scales; ground of fore wing usually shaded with green. 2  
Hind wing black brown, as in female; tufts small and fine, — the one on first segment of abdomen a little enlarged, but formed of fine hair-scales. . . . . 7
2. Fore wing fuscous, without green tint; hind wing almost wholly cream white, except above R. . . . . 3  
Fore wing marked with green (fading to a dull dirty yellow) either broadly, or reduced to shades costo-apically and in cell  $M_3$ , etc.; hind wing heavily shaded with fuscous toward border, at least along veins. . . . . 4
3. Evenly gray, as a rule, without costo-apical spot; a black dash in middle of cell  $Cu_1$  and in base of fold, fine lunate reniform etc.; antennæ pectinate. . . . . *daona*  
Blackish as a rule; with a contrasting cream costo-apical spot, a small ocellate st. spot in cell  $M_3$  and black dot in submedian; ren. short, b.d. obsolete. . . . . *gelduba*
4. Fore wing with anal angle lobed and tufted, inner margin sinuate, with long hair-scales antemedially; pm. finely white at anal angle only; cell  $M_2$  heavily and contrastingly shaded with brown (or with very little black) the pm. line weak and visible mainly on veins; hind wing with the dense dark scaling extending down to  $M_1$ . . . . . *lama*  
Fore wing with anal lobe slight or absent, — if present at all cell  $M_2$  is heavily shaded and striate with gray and blackish, the pm. is double, black and fairly complete, and st. area with brown. Hind wing with dense scaling only costally, cell R being whitish.

5. Fore wing with a white antemedial spot at inner margin, preceded by a yellow (green?) over a black streak (not seen)... *lopodites*  
No antemedial white or black streak on inner margin.....6
6. Anal angle slightly lobed and inner margin slightly sinuate, a fine white preanal crescent as in *D. lama*, but cell  $M_2$  largely gray, crossed by black bars, pm. line black, and hind wing whitish to R, and even above R with pale postmedial scaling..... *perplexa*  
Anal angle not lobed; white in pm. line located costally and along veins when present, not at anal angle; green areas slight and dull.  
*baracoana*<sup>1</sup>
7. Ground green, the ordinary lines more or less filled with dull flesh color, or if obscure, with reddish spots accompanying st. line.  
*biundata*<sup>2</sup>  
Ground grayish, or dull red-brown, the filling of lines and terminal area green and contrasting..... *livida*  
Without conspicuous or extended green.....8
8. Large, fore wing above about half blackish and half pearl gray (cream in female), forming a striking pattern..... *tharis*  
Moderate sized; not contrastingly of two colors; discal mark commonly a double black dot.....9
9. Shaded with whitish, pinkish buff, red brown and blackish, giving a general effect of oblique shades..... *notabilis*  
Rather evenly dull brownish or smoky gray.....10
10. Markings blurred, mainly formed of the ordinary lines; (female antennæ pectinate).....11  
Fore wing with dark streaks on veins, those on  $R_5$  and  $M_1$  connected by oblique streaks to costa; inner margin with a pattern of oblique darker brown and white markings, the upper edge of tegulae whitish; female antenna simple..... *lignea*
11. Thorax with a high divided blackish tuft on disc; fore wing smooth looking, only the black lower d.d. and a smoky and whitish spot at anal angle conspicuous..... *matralis*  
Thorax with tufting low and normal, with no contrasts; fore wing with all pattern elements obvious, the two discal dots subequal.  
*satis*

<sup>1</sup> Male of *D. altis* is likely to run out here, perhaps distinguished by a green terminal area as in female; also *D. tuna* Schaus, which is buff and brown (green?) with black basal dash, dash in discal fold and subterminal spot toward inner margin. Hind wing dark.

<sup>2</sup> The green is very dull and fugitive; *D. virida* is very similar, but with brighter green ground, and the st. marked by a conspicuous whitish patch instead of blackish dots.

*Females*

1. Fore wing green or heavily marked with green, occasionally with most of the normally green area covered with a white post-medial patch. . . . . 2  
Fore wing with at most a few green spots subterminally. . . . . 4
2. Ground rather broadly green (frequently dull and somewhat mottled, and very fugitive). . . . . *biundata*<sup>1</sup>  
Ground grayish or brownish, the green filling the ordinary markings, and contrasting. . . . . *livida*  
Ground shading from brown into green, or with the postmedial green replaced with whitish. . . . . 3
3. Postmedial area covered with a large whitish triangle. . . *baracoana*  
Postmedial area light green, contrasting with the darker and largely brown base.<sup>2</sup> . . . . . *perplexa*
4. Fore wing with a black dash in middle of cell Cu<sub>1</sub>, normally connected with the discal bar and the lower spots of the inner st. line to form a loop. . . . . 5  
No black dash in cell Cu<sub>1</sub>, sometimes a black line on the vein.  
*go to alternative 8 of male key*
5. Outer and inner st. lines (true st. and adt.) confused above, there being an oblique series of black dashes from apex to discal fold; pm. portion of cell M<sub>3</sub> largely filled with a semicircular (green) patch, which forms the lower end of a large crescentic or somewhat spiral postmedial marking, the black st. dot in this cell normally wedge-like. . . . . *gelduba*  
Outer and inner st. lines separate to costa, the wedge-like st. spots accompanying the inner st. line so far as present; cell M<sub>3</sub> bisected by the well-marked pm. line, bicolored as a rule, not forming part of a spiral or crescentic marking. . . . . 6
6. Terminal area filled with green, except at costa where there is a green adterminal spot; cell M<sub>3</sub> with outer half green, the basal half dark. . . . . *altilis*  
St. and t. areas all gray, or brown at costa; outer half of area in M<sub>3</sub> redder than basal half. . . . . *daona*

<sup>1</sup> See note to male, above.<sup>2</sup> *D. lama*, whose female is unknown to me, will doubtless also run out here.

*Group I. Sexes unlike; male antennæ serrate, female simple*

## DISPHRAGIS GELDUBA Schaus

*Rifargia gelduba* Schs. Proc. Zoöl. Soc. 1892, 339.

Figured: Biol. 92: 3 ♀; Seitz 150: d5 ♂, 4 ♀.

Only two males taken; female common (see diagram, p. 245).  
Described from Mexico. Represented by *D. phasma* in Brazil.

*Group II. Sexes unlike, male antennæ pectinate, female simple*

## DISPHRAGIS DAONA Druce

*Heterocampa daona* Dr., Ann. Mag. Nat. Hist. (6) xii, 357, 1894.Figured: Biol. 90: 20 ♂; Seitz 150: d3 ♂ (var. *suavis*), 4 ♀.*Heterocampa androdora* Dyar, Proc. U. S. Nat. Mus. xxxviii, 256, 1910.*D. daona*, f. *suavis* Ddt. in Seitz, Macrolep. World vi, 970, 150: d3, 1932.? *Heterocampa cubana* Grote, Proc. Ent. Soc. Phil. v, 252, 4: 7 ♀, 1865.? *H. surinamensis* Msch. Verh. z.-b. Ges. Wien xxvii, 686, 10: 44 ♂, 1887.

Some of the names may represent slight races, but I think they are more probably merely color forms.

La Venta, Anton, Jan. 23 (Bts.). Ranges to Mexico, Cuba and the Guianas.

## DISPHRAGIS ALTILIS Schaus

*Heterocampa altilis* Schs. Ann. Mag. Nat. Hist (8) vii, 272, 1911.

Not figured.

Perhaps an extreme form of the last, with which it agrees in pattern, though not in coloring.

Mar. 27 (Fried.), ♀. Type a female from Costa Rica.

*Group III. Sexes unlike; antennæ pectinate, wider in male*

## DISPHRAGIS LAMA Schaus (Fig. 54)

*D. lama* Schs. Proc. U. S. Nat. Mus. xxix, 249, 1906.

Not figured.

The broad wings strongly lobed at the anal angle are distinctive; hind wing with costa very strongly arched, with very long hair, Sc touching cell only at a point at middle, then strongly divergent; R and



M<sub>1</sub> strongly stalked. I do not know the female. When fresh the moth shows no strong contrasts, but a beautiful velvety effect. *D. subalbida*, from southern Brazil, is related but less extreme in wing form.

Common (see diagram, p. 245). Described from Guiana.

#### DISPHRAGIS PERPLEXA Schaus

*D. perplexa* Schs. Ann. Mag. Nat. Hist. (8) vii, 276, 1911.

Figured: Seitz 150: k2 ♀ (hardly recognizable).

Male easily distinguished by the small anal lobe and fore wing shading from brown into green; female much like *baracoana*, but with blackish st. spots in st. area and submedian fold, the former sometimes ocellate with whitish, while *baracoana* has the st. line not emphasized there.

The commonest Disphragis (see diagram, p. 245). Ranges to Mexico.

#### DISPHRAGIS BARACOANA Schaus

♀ *Heterocampa baracoana* Schs. Trans. Am. Ent. Soc. xxx, 145, 1904.

♂ *Heterocampa habilis* Schs. Proc. U. S. Nat. Mus. xxix, 250, 1906.

Figured: Seitz 151: a3 ♂ (unrecognizable), 4 ♀.

The male is a variable mixture of dull olive and dull smoky, darkening to a blackish shade or patch over end of cell, and with all the pattern distinct but not contrasting; the female usually has a contrasting white area beyond cell, but if this is green it can be separated from *perplexa* by the more wedge-like st. spots above inner margin and from *edwardsi* (*masta*, *muscosa*) by the pectinate antennæ.

Dec. 5 to Feb. 22. Mexico to Guiana (C.U.) and Brazil.

#### Group IV. Sexes similar; female antenna simple

##### DISPHRAGIS BIUNDATA Walker

*Heterocampa biundata* Wlk. List Lep. Ins. Br. Mus. v, 1025, 1855; Pack. Mem. Nat. Acad. Sci. vii (Monog. Bomb. Moths i) 235, 5: 4 ♂, 5 ♀, 32: 1, 2, 3, 4 (larva) — with full life history and bibliography.

*Stauropus viridescens* Wlk. List Lep. Ins. Br. Mus. xxxii, 416, 1865.

*Cecrita* v. Biol. i, 234.

(Not *Cecrita biundata* of Biologia, which is *D. obliqua* Pack., a member of Group II).

For the large North American Bibliography (missed by the Lep. Cat.) see Packard, l.c. The species is a minor pest in the North, associated with *D. guttivitta*, and part of the large economic literature of the latter should be credited here.

The green color of this species is particularly fugitive, and is lost in the five Central American specimens at hand. Tropical specimens are generally smaller and more mottled than those from the north. Larva green, with a large irregular dorsal reddish or reddish-edged patch, or with pale dorsal patch and brown on sides, or occasionally all green and white; first stage with antlers on prothorax, but body unarmed. A general feeder on soft-leaved trees.

Jan. 26 (Bts.), La Venta, Anton, Jan. 23 (Bts.). Chiriqui (Lutz); Lancetilla, Honduras (Bts.). Southern Canada to southern Brazil.

#### DISPHRAGIS LIGNEATA Walker

*Etobesa ligneata* Wlk. List Lep. Ins. Br. Mus. xxxii, 471, 1865.

*Heterocampa aconthea* Druce, Biol. Centr. Am. Lep. Het. ii, 458, 90: 24, 1898.

Also figured: Seitz 150: g2 ♂, 4 ♀.

Jan. 27, Feb. 3 (Bts.), Apr. 24 (Fried.). Ranges north to Mexico.

#### DISPHRAGIS NOTABILIS Schaus (Fig. 53)

*Heterocampa notabilis* Schs. Proc. U. S. Nat. Mus. xxix, 253, 1906.

Figured: Seitz 150: g3.

The coloring of Seitz' figure is good, but the markings are really much crisper.

Flight scattering, Dec. to Apr. Bates got a heavy flight at Lancetilla, Honduras, the end of April. Ranges to Guiana and Peru.

*Group V. Antennæ pectinate in both sexes, broader in male, sexes similar*

#### DISPHRAGIS LIVIDA Schaus

*Heterocampa livida* Schs. Ann. Mag. Nat. Hist. (8) vii, 274, 1911.

Figured: Seitz 150: k4 ♂, 5 ♀.

Female with green markings much bluer than male, in Seitz' figure and in the Nat. Mus., but this difference is likely to disappear in carelessly relaxed specimens. Female antenna pectinate.

Dec. 5 (Bts.). Lancetilla, Honduras, (Bts.). Costa Rica.

## DISPHRAGIS THARIS Stoll

*Bombyx tharis* Stoll in Cr. Pap. Exot. iv, 38, 308: D, 1787.

*Heterocampa laeca* Schs. Proc. Zoöl. Soc. 1892, 333; Biol. 91: 2; Trans. Ent. Soc. Lond. 1901, 303.

*D. tharis* form *livescens* Ddt. in Seitz, Macrolep. World, vi, 973, 150: f4, 1932. Also figured: Seitz 150: f3 ♂, 2 ♀.

The variety *livescens* has the black pattern more broken up, and in particular has much of the ordinary lines represented by paired black dots. It was described from southern Brazil, where the type also occurs.

Chief flight apparently in June (see diagram, p. 245). Mexico to southern Brazil. The true flight time may be later, as no systematic collecting has been done in July and August.

The two following species are placed by Schaus in *Malocampa*. I transfer them to *Disphragis*, as they appear to be close relatives of *notabilis* and *mephitis*, and no tangible difference is known in the imago.

## DISPHRAGIS SATIS Druce

*Heterocampa satis* Dr. Biol. Centr. Am. Lep. Het. ii, 457, 1898. (n.n.)

*Heterocampa punctata* Dr. Biol. Centr. Am. Lep. Het. i, 238, 1887.

(not *Bombyx punctata* Cr., which is a *Malocampa*).

Probably for technical reasons I should go back to the original name of *punctata*, but *satis* is now in use, and in case this species should turn out to be really a *Malocampa*, or the genera be combined, it would be necessary to revive it.

Jan. 4-Mar. 18 (Bts., Fried., A.M.N.H.). Ranges north to Mexico.

## DISPHRAGIS MATRALIS Schaus

*Malocampa matralis* Schs. Ann. Mag. Nat. Hist. (8) vii, 617, 1911.

Not figured.

A very close match to *D. mephitis*, but with less crisp markings, and distinct from all the related species in the high blackish thoracic tuft. The lower discal dot is much enlarged as in *D. mephitis*.

Dec. 7 to Feb. 20, Lancetilla, Honduras. Costa Rica.

## TALMECA Schaus

Slender, fore wing oblong; acc. cell shorter and broader than in the preceding, typically about a third or half as wide as an interspace; vestiture loose, more hairy than usual, especially on tegulae and palpi.

Male antennæ pectinate on basal  $\frac{3}{4}$ , rather abruptly decreasing to a simple apex. Frequently with  $R_5$  stalked (varying within the species), or with  $M_3$  and  $Cu_1$  of hind wing stalked (separate in the present species). Anal tuft very long and bifurcate in male, short, but slightly bifurcate in female.

1. Ground dull rose and green; a red discal lunule. . . . . *consociata*  
 Ground clay, dusted with light rose; a black discal dot, occasionally obsolete. . . . . *lunulata*

#### TALMECA CONSOCIATA Schaus

*T. consociata* Schs. Proc. U. S. Nat. Mus. xxix, 264, 1906.

*Boriza povera* Schs. Proc. U. S. Nat. Mus. xxix, 264, 1906.

Not figured.

Fore wing dull rose, the usual markings more or less punctiform, deeper rose (ren. and st.) and blackish (am. and pm.), with three olive green stripes, on costa toward base, in outer part of cell and along fold; blackish shades mainly beyond the pm. opposite cell, and before it below cell. Terminal dots black and white, contrasting. Hind wing fuscous.

Oct. 30, 1934 (Bts.), 1 ♀. Described from French Guiana (*consociata*) and British Guiana (*povera*), the type of the latter almost illegible, but I think this.

#### TALMECA LUNULATA Dognin

*T. lunulata* Dgn. Het. Nouv. Am. Sud. ii, 34, 1911.

Not figured.

Pinkish gray; dusted and streaked with fuscous, the markings much broken, more or less picked out with fuscous scaling, an oblique am. bar at costa most distinct. Terminal dots black.

Dec. 6, 7, Jan. 29 ♀ (Bts.). Described from French Guiana.

A third, perhaps undescribed species is represented by a single female.

#### Group IV

#### RIFARGIA Walker

Similar to *Disphragis*, but with simple fasciculate antennæ; costa of hind wing arched and fringed; accessory cell reaching half way to apex, with  $M_1$  from its middle, and  $R_2$  and  $R_5$  free. Hind wing with Sc

and R connected at a point near middle and then rapidly diverging (except in *R. felderi*); palpus upturned to near middle of front, third segment short; front rough above it; scape without tuft above; spurs of hind tibiae short, a little longer in *R. bianca*.

1. Ground pale gray or white.....2  
Ground gray-brown, with a large rather triangular whitish area.  
*apella*  
Ground blackish; male with subapical spot; female with large, pale crescentic patch.....*Disphragis golduba*
2. Postmedial line single, black, contrasting, the basal line oblique out, also black and contrasting; marginal area heavily shaded with blackish.....*bianca*  
Postmedial line double, not contrasting, the antemedial and usually basal line also, similar.....3
3. Subterminal area, except for adterminal line, merely shaded with brown and blackish; basal line single, confused.....*felderi*  
Subterminal area with a series of black spots or wedges before the brown shade; subbasal line usually distinctly double.....4
4. Smaller; subterminal spots strong, the one in  $M_3$  intensely black and rather larger than the others; ground more shaded with brown and blackish; adt. line irregular; outer line of antemedial twice looped far out below cell, almost reaching below reniform.  
*myconos*  
Larger; subterminal spots smaller, the upper ones dashes, cell  $M_3$  with a large *pale* patch, sometimes bearing a *small* black dash; ground less shaded with brown; antemedial line not looped as far out in fold as in cell.....5
5. Fore wing faintly tinted with brassy; under side of hind wing with blackish outer area extensive, normally covering upper angle of cell, and sometimes almost the whole wing; postmedial line slightly straighter as a rule below cell.....*demissa*  
Fore wing gray-white in ground, or faintly bluish, not at all brassy; under side of hind wing with a moderate postmedial blackish shade, not nearly reaching cell; postmedial line typically distinctly sinuous.....*distinguenda*

#### RIFARGIA DISTINGUENDA Walker (Fig. 55)

*Acronycta distinguenda* Wlk. List Lep. Ins. Br. Mus. ix, 63, 1856.

Figured: Seitz 153: c2; Forbes, Sci. Surv. P.R. xii, 1: 4 ♂, 5 ♀.

The male usually has the antemedial space filled with blackish and contrasting, the female usually not; the amount and position of dark shades vary considerably, and the pm. space may be filled with blackish.

Common (see diagram, p. 245); all the specimens but one are females, and the complete absence of specimens in January (except a single one on Jan. 31), after a heavy flight in December suggests two broods. Mexico to Brazil.

#### RIFARGIA DEMISSA Schaus

*R. demissa* Schs. Proc. U. S. Nat. Mus. xxix, 270, 1906.

*R. d.* var. *brioca* Schs. Proc. U. S. Nat. Mus. lxiii (19) 45, 1928.

In the variety the st. space is filled with a contrasting blackish fascia.

Oct. 31-May 26. No specimens were taken in January, but too few in all to make the fact very significant. Mexico to Guiana and Amazons.

#### RIFARGIA MYCONOS Schaus

*Symmerista myconos* Schs. Proc. Zoöl. Soc. 1892, 336.

*Figured*: Seitz 153: d1 ♂.

The male usually has a large blackish apical patch, the female is without, but I have a female from the upper Amazons with a fairly intense patch. All the present lot are females.

Feb.-Mar. (Bts., A.M.N.H.). Lancetilla, Honduras, Apr. 26 (Bts.). Ranges to Brazil and Guiana.

#### RIFARGIA FELDERI Schaus

*R. felderi* Schs. Trans. Ent. Soc. Lond. 1901, 318.

*Figured*: Seitz 153: d4.

This belongs with *R. haitia* and *nebulosa* to a little group in which Sc and R are closely parallel for a short distance before diverging; but they have the arched costa with a long fringe of hair, unlike *Meragisa*.

Jan. 18 (Bts.). Mexico to southern Brazil.

#### RIFARGIA BIANCA Schaus

*Blera bianca* Schs. Proc. Zoöl. Soc. 1892, 333.

*Figured*: Seitz 153: e3.

*R. lineata* Dr. is closely related, but lacks the contrasts, having a rather even pattern of whitish and gray, like *distinguenda*, but the

oblique subbasal and pm. lines of the present. It should be taken on the Island.

Feb. 22, Mar. 3 (Bts., Fried.). Lancetilla, Honduras (Bts.). Ranges to southern Brazil.

#### RIFARGIA APELLA Schaus

*Blera apella* Schs. Proc. Zoöl. Soc. 1892, 333.

*Figured:* Seitz 153: e4.

Gray portions strongly glossy; besides the costal triangle, there is a small whitish antemedial spot in fold.

Common (see diagram, p. 245). In this species the January gap is broken by two specimens taken Jan. 29 and 31. Ranges south to Brazil.

#### MERAGISA Schaus

Like *Rifargia*, except that Sc and R of the hind wing are always closely parallel for some distance beyond their point of connection, the costa is less arched, and not fringed with strikingly long hair.

#### MERAGISA VALDEVIESOI Dognin

*Orthosoma valdeviesoi* Dgn. Le Naturaliste, 1890, 193.

*Figured:* Dognin, Lep. Loja, 5: 8; Seitz 152: h1 (det.?).

Fore wing with normal pattern clear, rather fine and black, the lines double, and median area unusually wide and buff (perhaps green when fresh). There is some resemblance to *Drugera*, but the basal line is waved and the pm. less extended at the middle. The Seitz figure does not show the buff median area and is perhaps a misdetermination.

Mar. 12, — also Chiriqui (A.M.N.H.). Described from Ecuador.

#### MAGAVA Walker

Like *Rifargia*, except that the basal half of the male antenna has very long hair-tufts, appearing half pectinate to the naked eye, and the palpi are short, in the female barely exceeding the front.

#### MAGAVA MULTILINEA Walker (Fig. 56)

*M. multilinea* Wlk. List Lep. Ins. Br. Mus. xxxii, 503, 1865.

*Figured:* Biol. 90: 16; Seitz 151: g2.



Warm brown, reticulate with cream, and some small gray shades; apex pale; the double discal spots and st. spots darker brown.

Flight scattering (see diagram, p. 245). Costa Rica to Guiana and Porto Velho, Brazil. It was taken mixed with a similarly marked Cossid and a Eucleid (not yet determined).

#### PHASTIA Walker

Similar to *Rifargia*; wings very broad and squarish in the present species; Sc and R of hind wing closely parallel on outer half of cell, the base with a very large humeral cell reaching to middle of discal; antenna simple, but thickened at base ( $\sigma^7$ ); palpi upturned to vertex, the second segment hairy above.

#### PHASTIA ALCIMEDE Druce (Fig. 57)

*Oedemasia alcimede* Dr. Proc. Zool. Soc. 1890, 510.

Figured: Biol. 90: 2; Seitz 152: k2.

Umber brown, a pale st. patch at costa; base paler, with erect outer boundary (the subbasal line) Ordinary lines double, inconspicuous, the pm. oblique on upper half, deeply concave below. Hind wing blackish.

Oct. 28-Mar. 23. Lancetilla, Honduras, Apr.-May. Ranges to Bolivia.

#### DRUGERA Schaus

Very close to *Phastia*.  $R_2$  stalked from acc. cell; male antenna with a basal notch in shaft, followed by a fringe of stiff curved hair-scales in front; male legs enormously tufted. Hind wing with Sc and R forming a moderate basal cell, then closely parallel well toward apex of cell.

#### DRUGERA MORONA Druce (Fig. 58)

*Edema morona* Dr. Biol. Centr. Am. Lep. Het. ii, 455, 90: 14, 1898.

Also figured: Seitz 148: g6.

Pale gray, powdery, the ordinary markings slightly raised; ordinary lines double, and blurred. Basal line erect, the outer edge of a pale basal patch in male; am. outwardly oblique; pm. broadly double and blurred, offset out in cell  $M_3$ ; median strong, single. Female with base less contrasting, pm. line and am. toward costa more often emphasized by a dark gray shade.

Common, flight scattering (see diagram, p. 245). Lancetilla, Honduras (Bts.) Costa Rica and Chiriqui (types).

#### RINCODES Schaus

A very striking type. The following species is not quite normal, exaggerated in some ways and perhaps primitive in others, but nearer this than anything else. The nearest genus appears to be the South American *Gisara*, which has longer third segment of palpus, more normal body tuftings and pattern. *Notoplusia* is close, but has pectinate antennæ.

Antenna with a short plume above; palpus massive, beak-like, but with short third joint. Thorax with high crests on tegulæ; abdomen in the present species with a high tuft on third as well as first segment (unique in the *Notodontidæ*, I believe) and small tufts on second and fourth. Anal tuft forming a large trough, with high crest-like sides and a flat horizontal tuft below.  $M_3$  and  $Cu_1$  stalked in fore wing, apparently stalked in hind wing; otherwise normal (as in *Meragisa*).

#### RINCODES FLAVODISCATA Dognin (Fig. 59)

♀ *Chadisra flavodiscata* Dgn. Het. Nouv. Am. Sud. ii, 32, 1911.

♂ *Notoplusia distinguenda* Roth., Nov. Zoöl. xxiv, 240, 3: 2 ♂, 1917.

Also figured: Seitz 152: e6 ♀.

Gray with contrasting oblong bright yellow-green reniform. Female figured as with pale yellow reniform (perhaps faded). This species might be considered a *Notoplusia*, if the antennæ are not considered significant. It has nothing to do with *Chadisra*.

Nov. 25, Jan. 26, Feb. 3 (Bts.), Feb. 8 (Fried.). Lancetilla, Honduras (Bts.). Guiana (types).

#### BLERA Walker (*Chadisra* auct. in part)

This genus and the following are distinguished by the continuous wide separation of Sc and R in the hind wing, and particularly long oblique "cross-vein" (i.e. free part of  $R_1$ ). Fore wing as in *Meragisa*, also head and body.

Schaus and others, by considering a certain limited list of characters, have combined this genus with the Old World *Chadisra*. While the venation is almost identical, and the other superficial characters are common to most of the *Notodontinæ*, the larva of *Chadisra* as figured

by Moore (Lep. Ceylon ii, 121: 2a) is Notodontine, while the male last sternite of *Blera* is Heterocampine. Also the short acc. cell of *Chadisra* and long one of *Blera* are typical of the two tribes. So far as we know now, then, there is no genus common to the tropics of both hemispheres.

1. Whitish or light gray, with brown antemedial and subterminal costal patches. . . . . *arecosa*  
 Dark dull brown, with dead-wood pattern. . . . . *cuculoides*

#### BLERA CUCULLOIDES Schaus

*Chadisra cuculoides* Schs. Proc. U. S. Nat. Mus. xxix, 266, 1906.

*Boriza lignosa* Dgn. Ann. Soc. Ent. Belge, 1909, 83.

*Tagela pigritia* Dgn. Het. Nouv. Am. Sud. viii, 90, 1914.

Dec. 6, 1 ♀ (Bts.). Ranges to Guiana and southern Brazil.

*B. arecosa* Dr. covers the Canal Zone in its range, and was taken at Lancetilla, Honduras (Bts.) and Chiriqui (A.M.N.H.).

#### RHUDA Walker

Structures almost as in *Blera*, with the same wide space between Sc and R of hind wing; fore wing long and triangular, hind wing very small. Vertex with a massive tuft, antenna with a strong fringe on scape, not quite a plume.

A slight variant of *Blera*, more distinct in appearance than in essentials.

#### RHUDA FOCULA Cramer (Fig. 60)

*Bombyx focula* Cr. Pap. Exot. iv, 187, 383: G, H, 1782.

Also figured: Seitz 151: g4.

Large; fore wing pale gray with large brown costal patch, hind wing blackish with yellow disc.

Feb. 3 (Bts.); Lancetilla, Honduras (Bts.). Guiana.

#### Tribe HEMICERATINI

This tribe is directly derived from the Notodontini, as the cleft or emarginate 8th sternite shows. So far as I know it is wholly Neotropical. The first genus is more primitive in having  $M_1$  and  $M_3$  as widely spaced as though  $M_2$  were still present, but has an exaggerated 8th sternite. The rest are closely related, and perhaps not all distinct.

## ANITA Schaus

Acc. cell long and slender,  $M_1$  near its middle,  $R_2$  and  $R_5$  free, the venation otherwise normal. Fore wing in the two present species oblong with highly arched costa, more triangular in *A. divisa*. Male antenna pectinate for a variable distance, with simple tip, female pectinate in *A. cymantis*, simple in *A. basipuncta*, the genotype.

1. Fore wing with costal half faintly brassy, dorsal half fuscous, costal edge with blackish; base dark; pm. line finely lunulate, white filled. . . . . *basipuncta*

Fore wing dull brown, the ordinary lines blurred, double, blackish; orb. and ren. small, black, of raised scales, and a small am. raised tuft in fold; orb. an oblique bar, ren. a bar with a dot at its lower end. . . . . *cymantis*

## ANITA BASIPUNCTA Schaus

*A. basipuncta* Schs. Trans. Ent. Soc. Lond. 1901, 332, 12: 8 ♂.

Also figured: Seitz 155: b2 ♀.

Dec. 11 (Bts.), Feb. 5 and Apr. 4 (Fried.), all females. Guatemala to southern Brazil.

## ANITA CYMANTIS Schaus

♂ *Pronerice* (?) *cymantis* Schs. Proc. U. S. Nat. Mus. xxix, 231, 1906.

♀ *A. lassa* Schs. Proc. U. S. Nat. Mus. xxix, 279, 1906.

♂ *Proanita squalida* Dgn. Het. Nouv. ii, 43, 1911.

This synonymy is based on notes on the types in the U.S. National Museum. *P. essequiba* is near but distinct; it is light gray, much lighter than the Seitz figure (155: b4).

Nov. 29, Dec. 6, Jan. 10, Feb. 2, all females. Described from the Guianas.

## COLAX Hübner

Similar to *Hemiceras*, very large. Fore wing truncate. No acc. cell,  $M_1$  strongly stalked,  $R_2$  further, and  $R_5$  beyond  $R_2$ ;  $M_2$  from middle of end of cell; hind wing relatively small, abdomen long, but without strong tuft.

## COLAX APULUS Cramer

*Sphinx apulus* Cr. Pap. Exot. i, 139, 88: E, 1779.

Also figured: Seitz 155: d1, 2 (as *apulana*) 3? (more probably male of *C. phocus*).

Warm brown, the pm. line waved and offset on Cu, its upper half roughly perpendicular to costa. Larva (U. S. Nat. Mus.) with many or most setae enlarged into paddle-shaped hair-scales, including vi, and about 10 setae representing vii; body presumably green (tawny in the inflation), with a yellow stigmatal stripe, fading out at ends, the dorsum reddened above it. Head spotted, anal and a preanal plate blackish, but cervical shield pale. (Anal prolegs damaged).

*C. phocus* from southern Brazil is darker with the pm. line nearly even below the cell; in *Procolax apulana*, which is regional,  $R_2$  is stalked beyond  $R_5$  and the pm. is evenly wavy across the wing.

May 9 and June 21 (Fried.). Ranges to the Upper Amazon.

#### HEMICERAS Guenée (with *Epicoria* Walker, etc.)

Antenna pectinate about half way to apex in male, or less, with very long simple apex, in female similar or simple, differing in closely related species. Front nearly smooth, palpi exceeding it but little, with third segment short. Fore wing with excurved outer margin, costa often noticeably straight, inner margin either simple or more or less lobed. Acc. cell slender,  $R_2$  and  $R_5$  free from its tip,  $M_1$  as a rule beyond its middle,  $M_2$  well toward upper angle of cell; hind wing with Sc and R closely parallel for a distance, then diverging well before end of cell;  $M_1$  and  $M_3$  noticeably approximate to margin, less than half as far apart as width of cell.

Larva smooth, with at most enlarged tubercles on 8; hind legs well developed, sometimes held raised; normally green, with subdorsal pale lines, and sometimes oblique lateral lines. Occasionally injurious to coffee shade trees (*Erythrina* and *Inga*). The larva figured by Stoll as *H. mconna* (Pap. Exot. Suppl. 23: 7) does not belong here, but is probably a *Malocampa*, as figured by Sepp (i, 13); but *Bombyx tetrastigma* Sepp (ii, 72) is certainly a *Hemiceras*, and most probably *H. subdigna* or *unimacula* Dyar, which I have from Guiana; it is omitted from the Lep. Cat.

The following key is primarily for males; females usually show the same characters, but are larger, and lack the gland on the hind wing. The key leans heavily on that of Dyar (Proc. Ent. Soc. Wash. ix, 56), as modified by Draudt (Seitz vi, 1026).

1. Postmedial and antemedial lines of fore wing acutely bent a little below costa, the former then straight and a little waved to inner margin.....*commentica*

- Postmedial line not sharply bent in to costa, straight, excurved, or sinuous; the antemedial either even or moderately waved. . . . 2
2. Postmedial line even, rarely accented by dots on veins, antemedial and sometimes subbasal similar. . . . . 3
- Postmedial line waved or represented by a series of dots on the veins; antemedial similar, when distinct usually forming about 4 zigzags; subbasal obscure. . . . . 11
3. Ground of fore wing in broad transverse shades; — a dark basal shade, dark before antemedial and after postmedial, and at margin on upper half; pale on basal half of median area and subterminally. . . . . *plusiata*
- Ground not so subdivided, usually unicolorous. . . . . 4
4. Subbasal line fine, even, pale, similar to antemedial. . . . . 5
- Subbasal line irregular and obscure or absent. . . . . 6
5. Ground pale gray, somewhat blotchy. . . . . *indistans*
- Ground dark brown, even. . . . . *plana*
6. Ground bright lemon yellow, more or less shaded with pale brown, but leaving terminal space clear. . . . . *flava*
- Ground not yellow, usually buff or light brown. . . . . 7
7. Postmedial line strongly oblique and nearly straight, ending on costa about  $\frac{1}{12}$  way back from apex; dark veins, lines and a dark subterminal shade present. . . . . 8
- Postmedial line reaching costa at about  $\frac{5}{6}$ , nearly straight, or somewhat and evenly excurved; veins not or faintly accented, no dark st. shade. . . . . 9
- Postmedial line reaching outer margin about at  $\frac{3}{4}$ , distinctly curved above, and normally meeting the margin almost at right angles, commonly sinuate below; a medium small species, with dull brown ground, commonly mottled, and the ante- and post-medial lines very close together at inner margin. . . . . *dentata*
8. Warm brown (saya brown, 15'' i of Ridgway); discal mark a short bar on lower half of discocellular and a separate spot (sometimes obsolete) on R a little before it; hind wing light brown. . *colombia*
- Brownish gray (drab, 17''' of Ridgway) the hind wing correspondingly grayish; discal bar oblique, the whole height of the cell; vein-lines tend to be somewhat fusiform and to fade out before the pm. line. . . . . *veccina*
- Luteous, the brown vein-lines and shaded ordinary lines contrasting, the former running solidly up to the heavy pm. shade; hind wing luteous with buffy inner margin and no gland in male.

*cadmia*

9. Discal spot of two obliquely placed small, sharply defined brown spots; ground reddish brown, the hind wing hardly paler; antemedial line notably excurved. . . . . 10  
 Discal spots diffuse and not contrasting; fore wing darker and duller brown, much darker than hind wing; antemedial line erect, straight. . . . . *corema*
10. Ground light red-brown, the postmedial line yellow-brown, followed by luteous; base of hind wing luteous between veins. . . . . *clarki*  
 Ground deeper red-brown, with violet tint; pm. line chestnut and tawny; hind wing (♀) pale brown to base. . . . . *linea*
11. Ground deep bright yellow, shaded with tawny brown, and with a little white scaling at apex. . . . . *flavescens*  
 Fore wing pale and brassy yellow, or not yellow. . . . . 12
12. Basal area noticeably warmer red- or yellow-brown, contrasting with the duller or darker median area. . . . . 13  
 Basal area not light and contrasting with median area, if somewhat lighter, with the color dull luteous, or the outer boundary oblique. . . . . 14
13. Basal third of fore wing buff; head with a narrow white band only, the markings not defined with white. . . . . *meona*  
 Basal third deep red-brown, only a little warmer than median area; vertex with a large white patch, white spots on scutellum and markings more or less defined with white, in particular frequently with white at the apex of the fore wing. . . . . *nigrescens*
14. Fore wing with considerable white or whitish spots or dusting, contrasting with the brown ground, the white tending to gather antemedially in the fold. . . . . 15  
 Fore wing not contrastingly marked with white or pale gray. . . 16
15. Ground reddish buff, the whitish areas very extensive, the dorsal antemedial area and lobe largely white. . . . . *sparsipennis*  
 Ground red-brown, median area almost wholly of the brown ground color. . . . . *coatina*
16. Fore wing strongly glossy or silky, the costal portion at least toward the base above the cell, more or less distinctly pale, usually contrasting. . . . . 17  
 Fore wing not or hardly glossy, the costal portion not paler. . . 19
17. Base of collar white or pale yellow, concolorous with the vertex, but contrasting with the gray thorax. . . . . 18  
 Whole collar concolorous with rest of thorax (except for narrow



- dark edgings), costal area light brassy buff and noticeably paler than dorsum in male, but nearly concolorous in female, *walkeri*
18. Ground deep silky brown, the costal area luteous and strongly contrasting. . . . . *vinicosta*  
 Wings dominantly pale brassy, with only the thorax and dorsal third more or less infuscated. . . . . *pallidula*
19. Costal edge of fore wing pure white, contrasting with the rest of the wing; vertex with a large white spot; inner margin of fore wing deeply lobed. . . . . *conspirata*  
 Costal edge of fore wing concolorous, or a little paler. . . . . 20
20. Inner margin with a strong lobe, and excavated almost in a semi-circle beyond (a little less deep in H. soso, which is fuscous). . 21  
 Inner margin nearly even, only a little more excurved antemedially and somewhat concave beyond; ground of fore wing lighter. . . . . 24
21. Ground red-brown, vertex with well marked white scaling, which is usually also distinct on scutellum; hind wing white. . . . . 22  
 Ground fuscous or gray, vertex concolorous. . . . . 23
22. A medium small species, outer margin evenly rounded. . *rufescens*  
 A large species; outer margin sharply bent opposite cell, then oblique and nearly straight to anal angle. . . . . *micans*
23. With rather distinct dirty luteous shading in basal third, beyond the postmedial and more or less on margin; ground more brownish, sexes similar. . . . . *soso*  
 Ground of male lighter and decidedly grayish, the dark shading leaving a tendency to an oblique band; female all very dark with no tendency to a luteous base. . . . . *deornata*
24. A contrasting narrow blackish shade along costa; the rest of the wing (very faintly) greenish or brassy, with an oblique brassy shade from middle of subterminal region to anal angle. . . . . *monegonda*  
 Costal area concolorous, no distinct brassy shading. . . . . 25
25. Fore wing with ground of two shades, the darker forming a vague shade or patch from middle of cell to before anal angle and a shade from end of cell to above anal angle, leaving a paler band between them; pm. line formed of dots. . . . . 26  
 Ground even or irregularly mottled, without a pale oblique shade from cell to anal angle. . . . . 27
26. Female antenna simple; ground darker, more shining and more brownish, the oblique shade somewhat conspicuous. . . . *lepida*  
 Female antenna pectinate at base; dark elements of pattern much

reduced and not at all contrasting; more mottled and grayer looking. . . . . *zula*

27. Larger, duller, t.p. dots frequently marked with white.

*subochraceum*

Smaller, brighter, t.p. dots black only . . . . . *quebra*

*Group I. Three rather even pale lines*

HEMICERAS INDISTANS Guenée

*H. indistans* Gn. Sp. Gen. Ins. Lep. Het. vi (Noct. ii) 383, 1852.

*H. echo* Dyar, Proc. Ent. Soc. Wash. ix, 50, 1908.

*Figured:* Seitz 155: c3 (*indistans*), 4 (*echo*).

*H. proximata* Dgn. is probably the south Brazilian race; *H. beata* Schs. is a much darker species with dark brown hind wing, it overlaps the present one in Guiana.

Abundant from end of Jan. to end of Mar. (see diagram, p. 245). Guatemala to southern Brazil (Nova Friburgo).

HEMICERAS PLANA Butler

*H. plana* Btl. Trans. Ent. Soc. Lond. 1879, 34.

*Figured:* Seitz 155: f1.

Abundant (see diagram). Guiana and Amazons, apparently not reaching southern Brazil.

*Group II. Ordinary lines acutely angled below costa*

HEMICERAS COMMENTICA Schaus

*H. commentica* Schs. Proc. U. S. Nat. Mus. xxix, 285, 1906.

*Figured:* Seitz 156: c4, 5.

The area between the antemedial line and the large gray reniform is usually but not always strongly ruddy; the pm. line varies in the amount of dentation and of accompanying white. Guiana specimens are noticeably darker and browner, in some with a strong fuscous gray terminal area.

Common (see diagram). Guiana and the Amazon.

*Group III. Ante- and postmedial lines even and pale, not angulate, but basal obscure*

#### HEMICERAS PLUSIATA Felder

*H. plusiata* Fld. Reise Novara Lep. 97: 11, 1874.

Also figured: Seitz 155: e2.

*H. jejuna* Schs., from southern Brazil, is much lighter, gray instead of brown.

Common (see diagram, p. 245). Ranges to Bolivia and Southern Brazil.

#### HEMICERAS COLOMBIA Dyar

*H. colombia*, Dyar, Proc. Ent. Soc. Wash. ix, 52, 1908.

Figured: Seitz 155: h3.

*H. bilinea* is closely similar, but has much less brown along the pm. line, and paler hind wing. *H. tricolora* has a fore wing like the present species, but mostly white hind wing.

Common (see diagram). Described from Colombia.

#### HEMICERAS VECINA Schaus

*H. vecina* Schs. Trans. Ent. Soc. Lond. 1901, 335.

Figured: Seitz 155: h2.

Smaller and much grayer than the last, the st. shade less regular and veins much darkened.

Common (see diagram). Mexico to Colombia and Venezuela, re-appearing in southern Brazil (Minas and Espirito Santo).

#### HEMICERAS CADMIA Guenée

*H. cadmia* Gn. Sp. Gen. Lep. Het. vi (Noct. ii) 383, 13: 2, 1852; Smith Bull. xlv, U. S. Nat. Mus. 260, 1893; Dyar Bull. lii, U. S. Nat. Mus. 257, 1903;

Hambleton and Forbes, Arch. Inst. Biol. (S. Paulo) vi, Suppl. ii, 243, 1935.

*Comidara obliquilinea* Wlk. List Lep. Ins. Br. Mus. xxvi, 1695, 1862.

*Cargida cadmia* Holl. Moth Book fig. 381, 1903 (from type of *obliquilinea* — also figures venation and legs).

Also figured: Seitz 155: i1 (too dark for normal coloring).

Small, ground straw, brown shading on pm. line heavy; st. shade variable, often crossed by conspicuous fine brown bars on veins. The absence of a stigma distinguishes this species from all of this group.

Feb. 1 (Bts.), Feb.-Mar. (A.M.N.H.), July 22 (Banks). Texas to southern Brazil. Originally described from "North America," presumably Georgia or Florida.

#### HEMICERAS FLAVA Schaus

*H. flava* Schs. Proc. U. S. Nat. Mus. xxix, 286, 1906.

*Figured:* Seitz 155: i3.

Large, antemedial line erect, as in the preceding species, but weak.

Nov.-Mar. (see diagram, p. 245) (Bts., Fried., A.M.N.H.). Costa Rica (type) and Muzo, Colombia.

#### HEMICERAS CLARKI Schaus

*H. clarki* Schs. Ann. Mag. Nat. Hist. (8) vii, 285, 1911.

*Figured:* Seitz 156: a4.

Light brick red. In Seitz' figure the two discal spots are represented as separate and equal, the key places them as united; our specimens have the upper much smaller than the lower or weak.

Nov. 11-Mar. 3 (Bts., A.M.N.H.). Mexico to Venezuela.

#### HEMICERAS LINEA Guenée

*H. linea* Gn. Sp. Gen. Lep. Het. vi (Noct. ii) 381, 1852.

Not *figured*.

A single female agrees with a single male in the U. S. National Museum determined as this species. It is identical in markings with *clarki*, but much darker and redder, and may be merely a color form, in which case the name *linea* of course has priority.

June 27 (Fried.). Brazil (type and specimen in Nat. Mus.); Bolivia (Ddt. in Seitz).

#### HEMICERAS DENTATA Dognin

*H. dentata* Dgn. Hét. Nouv. Am. Sud. vii, 30, 1914.

*Figured:* Seitz 156: b2.

Most of the specimens are much more mottled than Seitz' figure, especially subterminally. The pm. line is noticeably excurved, and usually retracted to the inner margin.

Abundant (see diagram). Colombia, Peru.

Larva from Changuinola Distr., Bocas, Panama (Swift); light green; pupa naked. A pest on coffee shade trees.

*Group IV: Postmedial line dentate, generally oblique from costa, but with the tooth below Cu<sub>1</sub> accented; base of fore wing paler, buffy; inner margin with moderate lobe and notch.*

#### HEMICERAS MEONA Cramer

*Bombyx meona* Cr. Pap. Exot. iv, 132, 358: B, 1797.

*Hemiceras meona* Guenée, Sp. Gen. Lep. Het. vi (Noct. ii) 385, 1852, (except larva).

*Eulophopteryx splendens* Msch. Verh. z.-b. Ges. Wien xxvii, 684, 1878.

Also figured: Seitz 156: d5.

Not *B.* or *H. meona* Stoll, Suppl. Cr. Pap. Exot. 25: 7; Guenée, l.c.—larva.

The antemedial line is oblique out in general course, the scallop below A the farthest out; the lunules of the pm. line in M<sub>1</sub> and M<sub>2</sub>, M<sub>3</sub> and Cu<sub>1</sub> tend to form pairs and Cu<sub>2</sub> and two in the fold a triplet, — corresponding to the paired dots of *H. punctata*.

Not rare (see diagram, p. 245), the chief flight in Feb. Guiana.

#### HEMICERAS SOSO Dyar

*H. soso* Dyar, Proc. Ent. Soc. Wash. ix, 54, 1908.

Figured: Seitz 156: k4.

Much smaller and duller than *H. meona*, with very little of its gloss, the t.p. line almost regular and sometimes difficult to trace.

May 19 (Fried.). Lancetilla, Honduras. Mexico to Venezuela.

*Group V. Postmedial line waved or punctate, usually quite regularly from costa to inner margin; base of fore wing not pale (redder only in H. nigrescens); lobe of inner margin and the following notch very strong.*

#### HEMICERAS NIGRESCENS Schaus

*H. nigrescens* Schs. Trans. Ent. Soc. Lond. 1901, 340, 12: 9, 1901.

*H. obliquiplaga* Dyar, Proc. U. S. Nat. Mus. liv, 359, 1919.

Also figured: Seitz 156: i1.

A deeper colored version of *H. meona* with the notch stronger, coloring warmer, pm. more regular and am. line erect from lower edge of cell to inner margin.

Flight scattering (see diagram) in 1934–35, not taken in 1936. Ranges north to Mexico.

## HEMICERAS FLAVESCENS Schaus

*H. flavescens* Schs. Proc. U. S. Nat. Mus. xxix, 287, 1906.

*Figured:* Seitz 156: f3.

Bright yellow, more orange than *H. flava*, with Indian red shading, white dusting, dots on lines, and marks on head and scutellum, as in various species of this group. Hind wing straw yellow. Pm. tooth below Cu<sub>1</sub> emphasized as in *soso*.

Oct. 25 (Bts.), Jan. 7 (Fried.), Feb. 8, 9, Mar. 12 (A.M.N.H.).

## HEMICERAS WALKERI Schaus

*Salamboria deornata* Walker List Lep. Ins. Br. Mus. xxxiii 855, 1865.

*Hemiceras walkeri* Schs. (n.n.) Trans. Ent. Soc. Lond. 1901, 334.

*Figured:* Seitz 156: e2.<sup>1</sup>

Male generally paler than female, the paling toward the costa more distinct. Both have the st. dots enlarged into small spots at costa and inner margin, the latter enclosed in a fine black lunule belonging to the pm. line. *H. metallescens* Schs. is similar, but the pale costa and dark dorsum are separated by a sharp boundary on Cu<sub>2</sub>.

Oct.; Feb. to June (all collectors). Chiriqui, Mexico.

## HEMICERAS PALLIDULA Guenée (Fig. 61)

*H. pallidula* Gn. Sp. Gen. Lep. Het. vi (Noct. ii) 381, 13: 1, 1852.

*Larva:* Schaus, Trans. Ent. Soc. Lond. 1901, 340.

Also *figured:* Seitz 156: e5.

Similar to the preceding, smaller, paler, the inner margin more contrastingly gray; st. of a regular series of gray shades on veins. The genotype of *Hemiceras*.

Larva maroon, with two broad subdorsal yellow bands, ending at tubercles on 8th segment of abdomen, 3 lateral white lines; head and prothorax yellow, with black bands; tail white above; true legs and anal prolegs black, the other prolegs red.

The species varies a good deal in size, and most of the specimens

<sup>1</sup> The two *deornatas* of Walker, *Epicoria d.* (p. 853) and *Salamboria d.* (p. 855) stand in confusion. I am following the specimens as labelled by Schaus in the National Museum, but cannot reconcile the result with Walker's descriptions. Seitz has them mixed, citing *walkeri* to the reference for the wrong *deornata*, omitting both *deornatas* in the bibliography, and substituting *deornata* wrongly for *walkeri* in the text of this species.

seen, except from the Canal Zone, have two or more white spots on fore wing. The variation is not local.

Jan. 25 (Bts.), Feb. 14, 18, Mar. 11 (A.M.N.H.). Mexico to southern Brazil.

#### HEMICERAS SPARSIPENNIS Walker

*H. sparsipennis* Wlk. List Lep. Ins. Br. Mus. xii, 972, 1857.

*Epicoria canosparsa* Wlk. List Lep. Ins. Br. Mus. xxxiii, 853, 1865.

*Figured*: Seitz 156: f5.

Easily recognized by the light color and very extensive white markings.

Common (see diagram, p. 245) Guatemala to Brazil.

#### HEMICERAS COATINA Schaus

*H. coatina* Schs. Proc. U. S. Nat. Mus. lvii, 144, 1921.

*Figured*: Seitz 156: g1.

Mar. 25, May 2 (Fried.). Guatemala and Costa Rica.

#### HEMICERAS LOSA Druce

*H. losa* Dr. Proc. Zoöl. Soc. Lond. 1890, 511.

*H. carmelita* Mssn. in Stubel's Reise 148, 7: 4, 1890.

*H. lepida* Schs. Ann. Mag. Nat. Hist. (8) vii, 284, 1911.

Also *figured*: Seitz 156: e4.

The synonymy is after Draudt; our specimens are compared with the type of *lepida* Schs. The species is very near the following, and the male almost indistinguishable, but is browner, smoother looking, the fore wing perhaps more pointed.

Dec. 10, 23, Jan. 28 (Bts.). Costa Rica to British Guiana and Upper Amazons. The National Museum has a grayer specimen from Peru, which may be the true *carmelita*.

#### HEMICERAS ZULA Schaus

*H. zula* Schs. Ann. Mag. Nat. Hist. (8) vii, 286, 1911.

*Figured*: Seitz 156: e3.

Not rare, chief flight at end of Dec. (see diagram). Costa Rica.



## HEMICERAS DEORNATA Walker

*Epicoria deornata* Wlk. List Lep. Ins. Br. Mus. xxxiii, 853, 1865.

*Hemiceras cotto* Dyar, Proc. Ent. Soc. Wash. ix, 55, 1908.

*Figured:* Seitz 156: h3 ♀.

Grayer, more mottled, not glossy, the pale oblique shade strongly curved; discal bar and pm. line more contrasted in male; female dark with all markings less contrasting.

This is the identification of the National Museum, Walker's description suggests a redder species, and does not mention the dark discal bar or prominent oblique shade of the male.

Dec. 10, 25 (Bts.), ♀'s. Lancetilla, Honduras ♂ (Bts.). Mexico to southern Brazil.

## HEMICERAS CONSPIRATA Schaus

*H. conspirata* Schs. Proc. U. S. Nat. Mus. xxix, 289, 1906.

*Figured:* Seitz 156: g4.

Large, bright red brown, with the line fine and only the pure white costal edge, and markings on head, scutellum and notch of fore wing, distinct.

Chief flight in Feb. (see diagram, p. 245). Mexico to southern Brazil.

## HEMICERAS MICANS Schaus

*H. micans* Schs. Proc. U. S. Nat. Mus. xxix, 289, 1906.

*Figured:* Seitz 156: i5.

Very close to the last; costal edge buff, hind wing nearly white. Perhaps a mere color form.

Feb. 27, 1 ♂ (Fried.). Mexico.

*Group VI: Postmedial line waved or punctate, usually straight in general course; inner margin only rounded out antemedially and straight or slightly concave beyond.*

## HEMICERAS VINICOSTA Guenée

*H. vinicosta* Gn. Sp. Gen. Lep. Het. vi (Noct. ii) 384, 1852.

*Figured:* Seitz 157: d4 ♂, 5 ♀.

Very distinct by its dark silky color with contrasting pale costal shade. Inner margin not concave at all.

Common (see diagram, p. 245). Ranges to French Guiana, the Amazons and Porto Velho, Brazil (Nat. Mus.).

#### HEMICERAS MONEGONDA Schaus

*H. monegonda* Schs. Proc. U. S. Nat. Mus. lxxiii (19) 63, 1928.

Not figured.

Large, wings ample; light red-brown; head with a white bar between antennæ; costa blackish, inner fringe dark brown, the inner margin not at all concave. No contrast, only the vague reniform and a curved shade from beyond it to above anal angle a little more distinct; lines slight, punctate. Hind wing white with some reddish shade.

Dec. 22, 30, Jan. 22, Feb. 7 (M. C. Z.) Mar. 18 (A.M.N.H.). Costa Rica (type). Male unknown.

#### HEMICERAS SUBOCHRACEUM Walker

*H. subochraceum* Wlk. Char. Undescr. Lep. Het. 184, 1866.

*H. mora* Dr. Biol. Centr. Am. Lep. Het. i, 251, 1887.

Figured: Seitz 157: a1.

Ground lighter and markings darker shades of brown, without any contrasts; ren. a little darker; lines faint and accompanied by black and white points. Expanse of average male 40 mm., female somewhat larger. Base color Ridgway's Tawny Olive (17'' i), overlaid with snuff brown (15'' k) or bistre (15'' m).

Larva injurious to coffee shade trees (Swift),—a dark larva spinning a cocoon.

Common (see diagram). Ranges to Mexico.

#### HEMICERAS QUEBRA Schaus

*H. quebra* Schs. Tr. Ent. Soc. Lond. 1901, 339.

Not figured.

Extremely similar, somewhat smaller (35 mm.). Wing possibly a little shorter; color a little redder, the overlay nearest to Verona Brown (13'' k).

A female is doubtfully placed here, Feb. 3 (Fried.); also a male from Lancetilla, Honduras. It was described from Venezuela, and is exceedingly close to *H. rara* Schs. from Costa Rica and *H. kartabena* Schs. from Guiana. Only genitalic study will show if all these names represent distinct species or not.

## HAPIGIA Guenée

Very large. Palpi upturned, with second joint thick and smooth, third short; front smooth; scape smooth-scaled, without the rough hair of almost all the family, base of stalk thickened in male, with basal joints fused and forming a triangular prominence, this prominence and the scape crossed by an oblique groove. Antenna ciliate. Wings pointed, fore wing without acc. cell,  $R_2$  stalked beyond  $R_5$ ,  $M_1$  free or barely stalked,  $M_2$  from middle of end of cell, middle discocellular long and oblique; hind wing small, with Sc and R touching at a point at or beyond middle of cell; male frequently with a prominence near base and sex scaling.

A derivative of *Hemiceras*.

1. With several shaded bands perpendicular to the costa, three alternate ones stronger (the third representing the postmedial).

*nodicornis*

Postmedial line normal in course; at most with traces of the shaded bands. . . . . 2

2. Reniform, costo-apical and some other spots green. . . . . 3

These spots silver, pale golden or nearly concolorous. . . . . 4

3. Ground lighter, green color almost confined to cell-spots, the sub-apical spot mainly blackish. . . . . *smecrinthina*

Ground darker and more mottled, with considerable green antemedially and subapically. . . . . *repandens*

4. Postmedial line slightly excurved, metallic apical spot minute. . 5

Postmedial line strongly excurved; apical metallic spot a conspicuous crescent, filled with a whitish spot; ground warmer brown, hind wing relatively paler. . . . . *curvilinea*

5. Postmedial line not sinuous, erect or slightly and evenly excurved, not retracted in fold. . . . . *simplex*

Postmedial line somewhat sinuous and strongly retracted (either roundly or in a cusp) in fold. . . . . 6

6. Spots at end of cell pale golden, conspicuous. . . . . *raatzi*

Spots at end of cell blackish, with a faint brassy underlay, which gives them an olive tint in brilliant lighting. . . . . *eneana*

## HAPIGIA NODICORNIS Guenée

*H. nodicornis* Gn. Sp. Gen. Lep. Het. vi (Noct ii) 376, 12: 7, 1852.

Also figured: Seitz 157: e1, 2 (as *annulata*).

In the true *annulata* the abdomen is annulate, blackish and buff, in

*obliqua* there are four finer and equidistant bands on fore wing, in *hollandia* the margin is deeply scalloped. Male with a knob on Sc of hind wing where it is closest to R.

Jan. 9-Mar. 28; Lancetilla, Honduras (Bts.). Guatemala to Guiana (type) and Brazil (Cornell).

#### HAPIGIA CURVILINEA Schaus

*H. curvilinea* Schs. Trans. Am. Ent. Soc. xxx, 149, 1904.

Figured: Seitz 158: a1.

Ground rich brown, usually with a contrasting buff spot near base of fold; pm. blurred, strongly excurved.

Dec. 1-Mar. 22 (see diagram, p. 245). Guatemala to southern Brazil.

#### HAPIGIA SMERINTHINA Schaus

*H. smerinthina* Schs. Proc. U. S. Nat. Mus. lxxiii (19) 67, 1928.

Figured: Seitz 157: f3 (as *smerinthoides*).

Ground dull straw; reniform rather small, much smaller than in the true *smerinthoides*, which has a brighter buff and more mottled ground.

Jan. 29, Feb. 23 (Bts.). Ranges to Surinam and southern Brazil.

#### HAPIGIA REPANDENS Schaus (Fig. 63)

*H. repandens* Schs. Proc. U. S. Nat. Mus. xxix, 291, 1906.

Figured: Seitz 157: 2 ♂ (as *abscondens*), 1 ♀.

*H. notha* is more mottled, normally with buff patches; *H. gaudens* is darker, with contrasting white costal spots; *H. abscondens*, from Bogota, is described as blackish brown with a silver discal spot, and is obviously not the species from Brazil figured by Seitz. Druce (Biol. 92: 7) figures a true *Crinodes* under this name.

Chief flight at beginning of March (see diagram). Reported from Mexico to Brazil, at hand from Guiana and Santa Catharina, Brazil.

#### HAPIGIA SIMPLEX Walker

*Corymbia simplex* Wlk. List Lep. Ins. Br. Mus. xxxiii, 766, 1865.

*Lobogona hapygia* Fld. Reise Novara Lep. 98: 4, 1874.

*Hapigia ribbei* Dr. Biol. Centr. Am. Lep. Het. i, 244, 25, 8, 1887.

Also figured: Seitz 158: a2 (*simplex*), 4 (*ribbei*).

Draudt treats *ribbei* as a distinct species, with silver dots on the ante-medial line, but I consider it a mere color form; Druce's figure of the type (♀) does not have them.

Two of our specimens have three buff spots before the am. line as in the Seitz figure, the other two are without, as in Druce's figure. The postmedial line may be evenly excurved (as in all the figures and most specimens), bent opposite cell, or practically straight.

Not rare in 1934-5 (see diagram), not taken in 1936. Lancetilla, Honduras (Bts.) also before me from Guiana and Iquitos, Peru.

#### HAPIGIA RAATZI Möschler

*Chliara raatzi* Msch. Verh. z.-b. Ges. Wien xxxii, 350, 1883.

Figured: Seitz 158: a3.

The pm. typically forms a cusp in the fold, but may be evenly incurved. The present group and all specimens at hand except one from Venezuela are lighter than the type.

Jan. 4, Feb. 2, Apr. 22, Nov. 27. Guiana and Amazons.

#### HAPIGIA ENEANA Schaus

*H. encana* Schs. Proc. U. S. Nat. Mus. lxxiii (19) 68, 1928.

Like *H. raatzi* except for the dark ordinary spots, and perhaps a mere color form.

Oct. 9 (Bts.), Feb. 26 (Wood — A.M.N.H.). Lancetilla, Honduras (Bts.). Guatemala (type).

#### RHAPIGIA Schaus

Like Hapigia, except for a strongly lobed anal angle of fore wing.

1. Larger, outer margin even; pm. line mostly straight, simple, ordinary spots dull; base of inner margin buff, contrasting.

*accipiter*

Smaller, outer margin somewhat waved; pm. line excurved and accompanied by double black dots, the pair in fold typically enlarged, ocellate; base of inner margin concolorous. . . . *aymara*

#### RHAPIGIA ACCIPITER Schaus

*Hapigia accipiter* Schs. Proc. Zoöl. Soc. 1892, 340.

Figured: Seitz 158: e2.

Oct. 31-Mar. 3 (Bts., Fried.). Described from Brazil.

## RHAPIGIA AYMARA Schaus

*Hapigia aymara* Schs. Proc. U. S. Nat. Mus. xxix, 292, 1906.

Figured: Seitz 158: e3.

Feb. 15, 1 ♂ (Friedman). Described from French Guiana.

## CHLIARA Walker

Like *Hapigia*, but with scape and basal part of shaft merely thickened, not notched. (See Fig. 62).

## CHLIARA CRESUS Cramer

*Bombyx cresus* Cr. Pap. Exot. ii, 72, 142, C, 1780.

*C. moneta* Fld. Reise Novara Lep. 96: 7, 1874.

Also figured: Seitz 158: b2.

Straw with brown reticulation and markings, and much pale gold. I can see no difference between typical *cresus* (British Guiana, not Brazil), *moneta* (Amazons, not Panama) and the present Panama lot. *C. e. imperialis* Walker is distinct, with less silver and with the more reddish hind wing mentioned by Walker, but is hardly a distinct species.

Jan. 26 (Bts.), Feb. 12, Mar. 9, 11 (A.M.N.H.), June 17 (Fried.). Ranges to Guiana and the Amazons (type of *moneta*, also C.U.) and in a race to southern Brazil (type of *imperialis* and C.U.).

## ANTEA Hübner

Like *Hapigia* except male antenna not notched, with dense hair-scales above; palpus with third segment long; fore wing with a large lobe rather before middle of inner margin, the anal lobe slight and well beyond the pm. line. Usual lines slightly raised.

## ANTEA JUTURNA Cramer

*Phalena Noctua juturna* Cr. Pap. Exot. ii, 48, 129: E, 1780.

Also figured: Seitz 158: e1.

Light red brown, lines fine; orb. and ren. large, oblong and inverted U-shaped, the latter interrupting the median line. St. line offset at Cu<sub>1</sub> and Cu<sub>2</sub> but not M<sub>3</sub> (unlike the other species).

End of Jan. to Mar., late June (see diagram, p. 245). Ranges south to Brazil.

## Subfamily CERURINÆ

The typical Cerura group are nearly world-wide, though perhaps best developed in Asia, and represented only by a single subgroup of Cerura with a few species in the Neotropical. Kaseria is put here with much doubt; it has the Cerurine head, but has lost  $M_2$  of the hind wing, has preserved all hind tibial spurs, and the larva is unknown. Bates took a female at Lancetilla, Honduras.

## CERURA Schranck

Antennæ pectinate to apex in both sexes;  $M_2$  of hind wing strong; base of M traceable and forked in both wings, both forks ending below  $M_2$ ; acc. cell of fore wing minute or absent; hind tibia with end spurs only (except a few extra-limital species).

The genus has been subdivided into Cerura proper, Harpyia and Andria, but the differences are slight, larval and imaginal characters do not correspond, and there is no corresponding difference in pattern type. The present species would belong to typical Cerura, but is aberrant in pattern.

Brower has investigated this group and found that there are differences in genitalia not reflected in pattern differences, so the present determination is tentative, pending critical study.

## CERURA RARATA Walker (Fig. 64)

*C. rarata* Wlk. List Lep. Ins. Br. Mus. xxxii, 409, 1865; Druce, Biol. Centr. Am. Lep. Het. 91: 7; Barnes and McD. Contr. Nat. Hist. Lep. ii (1) 2: 2, 1913 (from Brownsville, Texas), Check List No. 3668, 1917, no. 3932, 1938. Also figured: Seitz 148: b4 ♂, 3 ♀.

Pure shining white, with black wave-lines. Larva presumably on willow, like *annulifera* Berg (Burmeister Lep. Argent. 503).

Chief flight in June (or later) (see diagram, p. 245). Southwest U.S. to Tucuman, Argentina; not seen from the Amazon basin.

## DIOPTIDÆ

Ocelli weak and covered by vestiture or absent; tongue strong, palpi upturned to middle of vertex or beyond, usually closely scaled; thorax and abdomen slender, usually close-scaled; the legs close-scaled, except a few Andean species, even the femora being smooth. Fore wing without accessory cell,  $R_3$  and  $R_4$  generally stalked the farthest;  $M_2$  from



middle of end of cell,  $M_1$  mostly free,  $M_3$  and  $Cu_1$  usually stalked in both wings and R and  $M_1$  in hind wing; cell sometimes shortened,  $M_1$  and  $M_2$  then thickened with a more or less distinct stridulating organ in male; hind wing with Sc and R closely parallel along basal part of cell, but free; tympanum of Notodontid type, most often small and inconspicuous.

Larva (*Phryganidia*) essentially as in the Notodontidæ, not modified, the last legs but little reduced; the skin minutely rugose. Pupa with hooked dorsal setæ on abdomen and long tongue.

The family is Neotropical. Besides the species described, all of which have striking colors or patterns, Banks caught a single female apparently transitional to the Notodontidæ, slender, but soft winged and inconspicuously marked with gray dusting on a white ground. It shows the characters, so far as I can make out, of *Momonipta*.

1.  $R_2$  of fore wing from cell,  $M_3$  and  $Cu_1$  remote. . . . . *Phæochlæna*  
 $R_2$  and  $M_3$  of both wings stalked. . . . . 2
2. Hind wing with a vein lost, R and  $M_1$  united; male with reduced hind wing and costal sex-scaling. . . . . *Getta*  
Hind wing with complete venation, R and  $M_1$  stalked. . . . . 3
3. Face and palpi with rough projecting hair, the roughness of the face most striking on sides beside the closely held palpi. . . . . 4  
Face and palpi close-scaled. . . . . 5
4. White species; scape with loose hair-scales; palpi barely upturned to middle of front. . . . . *Momonipta* ?  
Black species; scape rather closely and densely scaled; palpi upturned to vertex. . . . . *Actea*
5. Upper discocellular vein of fore wing oblique and about as long as middle one; cell short,  $M_1$  and  $M_2$  tending to be swollen at bases. . . . . 6  
Upper discocellular much shorter than middle one; cell long. . . . . *Josia*
6. Scaling thin; veins dark. . . . . *Tithraustes*  
Scaling dense; white vein-lines. . . . . *Scotura*

#### PHÆOCHLÆNA Hübner

Dyar reports *P. gyon* F. (*tendinosa* Hbn.) from the Zone. It is brown with yellow veins and pale, partly yellow spots.

#### MOMONIPTA Warren (*Stenoplastis* Felder ?)

Banks caught a female, apparently of this genus but too poor to describe.

## SCOTURA Walker

Most of the species are gray with contrasting pale veins and more or less white on disc of hind wing.

## SCOTURA FULVICEPS LEUCOPHLEPS Warren

[*Cymopsis fulviceps* Fld. Reise Novara Lep. 105: 25, 1868.]

[Figured: Seitz 68: (*fulviceps*), 12 (*f. peruviana*).]

[*S. nervosa* Sehs. Jour. N. Y. Ent. Soc. iv, 154, 1896; Prout, Nov. Zoöl. xxv, 408, 1918; Forbes Jour. N. Y. Ent. Soc. xxxix, 69, 1931 (race of *fulviceps*).]

*S. leucophleps* Warr. Nov. Zoöl. xvi, 74, 1909.

*S. nervosa leucophleps* Seitz 68: 14; etc.

The Canal Zone material may be treated as a race, though the differences from e.g. the Amazonian specimens are small. The present lot are all of a plain striped pattern, but other races are dimorphic, some specimens having white spots on the fore wing.

Common (see diagram, p. 245). Range (in races) to Costa Rica, Guiana and the Amazons.

Dyar reports *Tithraustes hamon* Dr. (Seitz 69: a5) from the Zone. It is translucent gray, with a large white discal spot on each wing, and two small subterminals on fore wing.

## ACTEA Butler

A variant of *Josia*, differing only in the rougher face and perhaps longer palpi. Earlier workers than Prout frequently extend the genus to include the similarly marked species which Prout transfers to *Josia*.

## ACTEA PSEUDENA Boisduval

*Retila pseudena* Bdv. Consid. Lep. Guat. 94, 1870.

Figured: Seitz 70: f2.

Black with a yellow transverse stripe on fore wing. Abdomen with yellow lateral stripes and dorsal dots.

Jan. 3 (Bts.), July (Banks), Feb.-Mar. (A.M.N.H.). Mexico to Colombia.

*JOSIA* Hübner (with *Ephialtias*, etc.)

All the species are black, with relatively simple patterns in yellow, less often red and white. There are many named forms, only a fraction

of which are probably good species, the body characters being in general more specific than those of the wings. My key (Jour. N. Y. Ent. Soc., xxxix, 74) is complete as to species, I believe, but does not pretend to place all the named forms.

1. Abdomen with a middorsal longitudinal stripe as well as lateral ones; hind wing red . . . . . *draconis*  
     Abdomen middorsally black; hind wing not red . . . . . 2
2. Hind wing wholly black; fore wing with an oblique or transverse yellow stripe . . . . . *ena*  
     Hind wing with a broad yellow or orange stripe . . . . . 3
3. Abdomen with a transverse basal yellow band . . . . . *cruciata*  
     Abdomen with side stripes only . . . . . *ligula*

#### JOSIA DRACONIS Druce

*Actea* (?) *draconis* Dr. Biol. Centr. Am. Lep. Het. i, 145, 14: 6, 1885.

Also figured: Seitz 70: h2.

A large transverse yellow band on fore wing, and a longitudinal red one on hind wing. Probably only a minor local race of *J. bryce*, and reported from the Zone by Dyar under that name.

Dec. 20 (Bts.), Feb. 29, Mar. 11, 19 (A.M.N.H.), July-Aug. 3 (Fairchild). Ranges in races to Guiana and the Amazons.

#### JOSIA ENA Boisduval

*Retila ena* Bdv. Consid. Lep. Guat. 95, 1870.

*Ephialtias tryma* Schs. Jour. N. Y. Ent. Soc. iv, 154, 1896.

Figured: Seitz 71: g1.

Only a single yellow band on fore wing, much broader than in *Actea pseudena*.

Mar. 17 (Lutz—A.M.N.H.), July-Aug. (Fairchild). Ranges to Guiana and Peru.

#### JOSIA CRUCIATA Butler

*J. cruciata* Btl. Ann. Mag. Nat. Hist. (4) xv, 340, 1875; Forbes Jour. N. Y. Ent. Soc. xxxix, 74 (in key).

Figured: Seitz 71: d2 (as *annulata*).

Not *J. annulata* Dgn., which has a very narrow stripe on the fore wing.

Both wings have a broad central yellow stripe.

Mar. 11 (Lutz—A.M.N.H.). General distribution uncertain

through confusion with related species. Described from Chiriqui; ranges at least to Guatemala (Biol.) and Peru (Cornell).

Dyar reports *J. fulvia* (i.e. *ligula*) from the Zone; it is very similar, but without the transverse stripe on the abdomen.

#### GETTA Walker

Differs essentially from *Josia* only in having R and M<sub>1</sub> completely united instead of stalked, and shows the same pattern. The males usually have the hind wing modified.

#### GETTA BEATIFICA Druce

*Ephialtias bætifica* (sic) Dr. Ann. Mag. Nat. Hist. (7) i, 213, 1898.

*Figured*: Seitz 71: k5.

Black, the basal half of fore wing, hind wing and abdomen suffused with blue; fore wing with a yellow transverse fascia. Male with lobed costa and sex-patches.

Mar. 11 (Gertsch — A.M.N.H.) July-Aug. (Fairchild). Colombia to Peru.